Public Notice

DEQ Requests Comments on WOF PNW Threemile Project's Proposed Air Quality Permit

DEQ invites the public to submit written comments on the conditions of WOF PNW Threemile Project, LLC's proposed air quality permit, known officially as an Oregon Title V Operating Permit.

Summary

The proposed permit is a modification of a Title V Operating Permit for an existing facility. The permit is also being renewed with this permitting action. The current permit was issued on Apr. 17, 2017 and scheduled to expire on Apr. 1, 2022. A complete and timely renewal application was submitted by the permittee, so the existing permit will remain in effect until the new permit is issued.

How do I participate?

To submit your comments for the public record, send them by mail, fax or email:

Nancy Swofford, Air Permit Coordinator
DEQ Eastern Region – Bend Office
475 NE Bellevue Dr., Suite 110
Bend, OR 97701
Fax: 541-388-8283
Email: Nancy Swofford

Written comments are due by 5 p.m. **Thursday, Apr. 25, 2019**

About the facility

This is a modification and renewal of a Title V Operating Permit for WOF PNW Threemile Project, LLC located at 75906 Threemile Road near Boardman, Oregon.

WOP PNW produces biogas that is currently used to operate three engine generator sets to generate electricity. This modification approves WOF PNW to construct a new gas treatment system that will produce pipeline quality natural gas from the digester biogas. The electricity and natural gas will be sold to the grid and the off-site natural gas pipeline, or possibly used onsite.

What air pollutants would the permit regulate?

This permit regulates emissions of the pollutants listed in the table at the end of this document.

How does DEQ determine permit requirements?

DEQ evaluates types and amounts of pollutants and the facility's location, and determines permit requirements according to state and federal regulations.

How does DEQ monitor compliance with the permit requirements?

This permit would require the facility to monitor pollutants using federally-approved monitoring practices and standards.

Formulas to calculate emissions are contained in the permit. The permittee is required to calculate facility-wide emissions and submit an emissions report semi-annually. Onsite inspections will be conducted to assure compliance with emission limitations.

What happens after the public comment period ends?

DEQ will consider and provide responses to all comments received at the close of the comment period. The Department will hold a public hearing if requested by 10 or more individuals or one person representing a group of 10 or more individuals. DEQ may modify provisions in the proposed permit, but the permit writers can only modify conditions of the permit in accordance with the rules and statutes under the authority of DEQ. Participation in the rulemaking or the legislative process is the only way to change the rules or statutes. Ultimately, if a facility meets all legal requirements, DEQ will issue the facility's air quality permit.

Where can I get more information?

Find out more and view the draft documents online at DEQ's "Public Notices", or contact Nancy Swofford, Air Permit Coordinator:
Phone: 541-633-2021 or 866-863-6668
Fax: 541-388-8283
Email: Nancy Swofford

View the draft permit and related documents in person at the Oregon Trail Library District at 200 S Main Street in Boardman or at the DEQ office in Pendleton. For a review appointment, call Bobbi DeMauro at 541-278-4614.

State of Oregon
Department of Environmental Quality

Eastern Region
Air Quality Program
475 NE Bellevue Dr.,#110
Bend, OR 97701
Phone: 541-388-6146
866-863-668
Fax: 541-388-8283
Contact: Walt West,
Permit Writer

www.oregon.gov/DEQ

DEQ is a leader in restoring, maintaining and enhancing the quality of Oregon's air, land and water.

Notice Issued: 3/21/2019
By: Nancy Swofford
Permit Number: 25-0047

Alternative Formats

DEQ can provide documents in an alternate format or in a language other than English upon request. Call DEQ at 800-452-4011 or email deqinfo@deq.state.or.us.

Emissions Limits

Criteria Pollutants: Table 1 below presents maximum allowable emissions of criteria pollutants for the facility. The current emission limit reflects maximum emissions the facility can emit under the existing permit. The proposed emission limit reflects maximum emissions the facility would be able to emit under the proposed permit. Typically, a facility's actual emissions are less than maximum limits established in a permit; however, actual emissions can increase up to the permitted limit.

Table 1

Criteria Pollutant	Current Limit (tons/yr)	Proposed Limit (tons/yr)
Particulate matter	24	24
Small particulate matter	16	14
Fine particulate matter	15	9
Nitrogen oxides	39	39
Sulfur dioxide	39	39
Carbon monoxide	151	151
Volatile organic compounds	39	39
Greenhouse gas	74,000	74,000

For more information about criteria pollutants, go to: Criteria Air Pollutants

Hazardous Air Pollutants: WOF PNW Threemile Project, LLC is not a major source of hazardous air pollutants, however EPA has determined that businesses similar to this facility, as a group, emit enough hazardous air pollutants to warrant regulation. Therefore, this source is subject to the following National Emission Standard for Hazardous Air Pollutants: 40 CFR, Part 63, Subpart ZZZZ (Stationary Reciprocating Internal Combustion Engines). Table 2 summarizes the hazardous air pollutants that trigger the NESHAP. More detailed information can be found in the Review Report.

Table 2

Hazardous Air Pollutants	Potential Emissions (tons/yr)
Formaldehyde	1.47
Methanol	0.23
Acetaldehyde	0.21
Various Other HAPs	0.44
Total HAPs	**2.35**

For more information about hazardous air pollutants, go to:
Health Effects Notebook for Hazardous Air Pollutants

State of Oregon Department of Environmental Quality

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
OREGON TITLE V OPERATING PERMIT

Eastern Region
475 NE Bellevue Dr., Suite 110
Bend, OR 97701

Issued in accordance with provisions of ORS 468A.040
and based on land use compatibility findings included in the permit record.

ISSUED TO:

WOF PNW Threemile Project LLC
75906 Threemile Road
Boardman, OR 97818

INFORMATION RELIED UPON:

Application Number: 30204
Received: 8/3/18

PLANT SITE LOCATION:
75906 Threemile Road
Boardman, OR 97818

LAND USE COMPATIBILITY STATEMENT:
Issued by: Morrow County
Dated: 01/11/2012

ISSUED BY THE DEPARTMENT OF ENVIRONMENTAL QUALITY

_____ _____
Mark W. Bailey, Eastern Region Air Quality Manager Date

Source(s) Permitted to Discharge Air Contaminants (OAR 340-216-0020):

Table 1 Code	Source Description	SIC
Part B, 27	Electrical Power Generation from Combustion	4911
	Anaerobic Digester Gas Production, Processing, and associated fuel burning equipment.	4932

RESPONSIBLE OFFICIAL
Title: CFO

FACILITY CONTACT PERSON
Name: Marty Myers
Title: General Manager
Phone: 541-481-9278

Significant Permit Modification

In accordance with OAR 340-218-0180, Oregon Title Operating Permit 25-0047 is revised and renewed to read as follows:

TABLE OF CONTENTS

LIST OF ABBREVIATIONS THAT MAY BE USED IN THIS PERMIT 3

PERMITTED ACTIVITIES 4

EMISSIONS UNIT (EU) AND POLLUTION CONTROL DEVICE (PCD) IDENTIFICATION 4

EMISSION LIMITS AND STANDARDS, TESTING, MONITORING AND RECORDKEEPING REQUIREMENTS 5

PLANT SITE EMISSION LIMITS 11

EMISSION FEES 12

GENERAL TESTING REQUIREMENTS 13

GENERAL MONITORING AND RECORDKEEPING REQUIREMENTS 15

REPORTING REQUIREMENTS 16

GENERAL CONDITIONS 18

LIST OF ABBREVIATIONS THAT MAY BE USED IN THIS PERMIT

ACDP	Air Contaminant Discharge Permit
Act	Federal Clean Air Act
ASTM	American Society of Testing and Materials
Btu	British thermal unit
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO_2e	Carbon Dioxide Equivalent
CPMS	Continuous Parameter Monitoring System
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EF	Emission Factor
EPA	US Environmental Protection Agency
EU	Emissions Unit
FCAA	Federal Clean Air Act
FSA	Fuel Sampling and Analysis
GHG	Greenhouse Gas
gr/dscf	grain per dry standard cubic feet (1 pound = 7000 grains)
HAP	Hazardous Air Pollutant as defined by OAR 340-244-0040
HCFC	Halogenated Chloro-Fluoro-Carbons
ID	Identification Number or Label
I&M	Inspection and Maintenance
NA	Not Applicable
NO_x	Nitrogen Oxides
O2	Oxygen
OAR	Oregon Administrative Rules
ODEQ	Oregon Department of Environmental Quality
ORS	Oregon Revised Statutes
O&M	Operation and Maintenance
Pb	Lead
PCD	Pollution Control Device
PM	Particulate Matter
PM_{10}	Particulate Matter less than 10 microns in size
$PM_{2.5}$	Particulate Matter less than 2.5 microns in size
ppm	parts per million
PSEL	Plant Site Emission Limit
psia	pounds per square inch, actual
SERP	Source Emissions Reduction Plan
SO_2	Sulfur Dioxide
ST	Source Test
VE	Visible Emissions
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds

PERMITTED ACTIVITIES

1. Until such time as this permit expires or is modified or revoked, the permittee is allowed to discharge air contaminants from those processes and activities directly related to or associated with air contaminant source(s) in accordance with the requirements, limitations and conditions of this permit. [OAR 340-218-0010 and 340-218-0120(2)]

2. All conditions in this permit are federally enforceable, meaning that they are enforceable by DEQ, EPA and citizens under the Clean Air Act, except Conditions 8, 9, 10, G5 and G9 (OAR 340-248-0005 through 340-248-0180) are only enforceable by the state. [OAR 340-218-0060]

EMISSIONS UNIT (EU) AND POLLUTION CONTROL DEVICE (PCD) IDENTIFICATION

3. The emissions units regulated by this permit are the following: [OAR 340-218-0040(3)]

Table 1: Emission Units and Pollution Control Device Identification

Emission Unit Description	EU ID	Pollution Control Device Description	PCD ID
Three engines that combust digester biogas to generate electricity.	ENG1 ENG2 ENG3	None	NA
Three engines that combust natural gas to generate electricity. The engine emissions are directed to pass through the (DRYER).		Cyclone, Baghouse and Scrubber	Cyclone Baghouse & Mist Scrubber
Alternative Operating Scenario (AOS) for the three engines when burning natural gas. Emissions are directed to a single dump stack upstream of the (DRYER).	ENG1-AOS ENG2-AOS ENG3-AOS	None	NA
Flares are used to control biogas produced by the anaerobic digester (AD).	AD	Flares are for operational flexibility to ensure biogas is not vented to the atmosphere when the engines and/or the gas treatment system is down	SRT, PFD1, & PFD2
			FL-1 FL-2
Gas Treatment System that removes CO_2 from the biogas to produce natural gas.	TAILGAS	None	NA
Boiler that combusts natural gas and supplies heat to the Gas Treatment System. One 16 MMBtu/hr natural gas fired boiler.	BOILER	None	NA
Fiber dryer that includes a 7.6 MMBtu/hr natural gas burner.	DRYER	Cyclone, Baghouse and Scrubber	Cyclone Baghouse & Mist Scrubber
Bedding storage area.	BEDDING	None	NA
Vehicle traffic on unpaved roads.	UPR	Water application (when needed)	NA
Aggregate insignificant activities including emissions from material handling (MH) from the digester feedstock bedding, blowers and office heaters.	AI	None	NA

4. The permittee must operate and maintain air pollution control devices and emission reduction processes at the highest reasonable efficiency and effectiveness to minimize emissions. Air pollution control devices and components must be in operation and functioning properly at all times when the associated emission source is operating. [OAR 340-226-0120]

EMISSION LIMITS AND STANDARDS, TESTING, MONITORING AND RECORDKEEPING REQUIREMENTS

The following tables and conditions contain the applicable requirements along with testing, monitoring and recordkeeping requirements for the emissions units to which those requirements apply.

Facility-Wide Requirements (including emission units UPR and MH)

Table 2: Facility-Wide Requirements

Applicable Requirement	Condition Number	Pollutant/ Parameter	Limit/Standard	Testing Condition	Monitoring Condition	Recordkeeping Condition
340-208-0210(2)	5	Fugitive Emissions	Minimize	NA	7	7.c.
340-208-0300	8	Nuisance	No Nuisance	NA	NA	10
340-208-0450	9	PM >250µ	No Fallout	NA	7	10
40 CFR Part 68	12	Risk Management	Risk Management Plan	NA	12	NA

Fugitive Emissions

5. Applicable Requirement: The permittee must not allow or permit any materials to be handled, transported or stored; or a building, its appurtenances, or a road to be used, constructed, altered, repaired or demolished; or any equipment to be operated, without taking reasonable precautions to prevent particulate matter from becoming airborne.

5.a. Such reasonable precautions include, but are not limited to the following: [OAR 340-208-0210(2)]

5.a.i. Use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads or the clearing of land;

5.a.ii. Application of water, or other suitable chemicals on unpaved roads, materials stockpiles, and other surfaces which can create airborne dusts;

5.a.iii. Full or partial enclosure of materials stockpiles in cases where application of water or chemicals are not sufficient to prevent particulate matter from becoming airborne;

5.a.iv. Installation and use of hoods, fans and fabric filters to enclose and vent the handling of dusty materials;

5.a.v. Adequate containment during sandblasting or other similar operations; and

5.a.vi. Covering, at all times when in motion, open bodied trucks transporting materials likely to become airborne.

6. Upon request by DEQ, the permittee must develop a fugitive emission control plan for approval by DEQ if the above precautions are not adequate, and implement the plan whenever fugitive emissions leave the property for more than 18 seconds in a six-minute period.

7. Monitoring Requirement: At least once each quarter for a minimum period of 30 minutes, the permittee must visually survey the plant for any sources of excess fugitive emissions. For the purpose of this survey, excess fugitive emissions are considered to be any visible emissions that leave the plant site boundaries for more than 18 seconds in a six-minute period. The person conducting the observation must follow the procedures of EPA Method 22. If sources of visible emissions are identified, the permittee must:

   7.a. Immediately take corrective action to minimize the fugitive emissions, including but not limited to those actions identified in Condition 5; or
   7.b. Develop a DEQ approved fugitive emission control plan upon request by DEQ and implement the plan whenever fugitive emissions leave the property for more than 18 seconds in a six-minute period. [OAR 340-208-0210(3)]
   7.c. Recordkeeping: The permittee must maintain records of the fugitive emissions surveys, corrective actions (if necessary), and/or the results of any EPA Method 22 tests. [OAR 340-218-0050(3)(a)]

Nuisance Conditions

8. Applicable Requirement: The permittee must not cause or allow air contaminants from any source to cause a nuisance. Nuisance conditions will be verified by DEQ personnel. [OAR 340-208-0300] This condition is enforceable only by the State.

9. Applicable Requirement: The permittee must not cause or permit the deposition of any particulate matter larger than 250 microns in size at sufficient duration or quantity, as to create an observable deposition upon the real property of another person. [OAR 340-208-0450] This condition is enforceable only by the State.

10. Recordkeeping Requirement: The permittee must maintain a log of each nuisance complaint received by the permittee during the operation of the facility. Documentation must include date of contact, time of observed nuisance condition, description of nuisance condition, location of receptor, status of plant operation during the observed period, and time of response to complainant. A plant representative must immediately investigate the condition following the receipt of the nuisance complaint and a plant representative must provide a response to the complainant within 24 hours, if possible. This condition is only enforceable by the state. [OAR 340-218-0050(3)(a)]

Fuels

11. No Other fuels other than natural gas, propane and digester biogas may be burned at this facility.

Accidental Release Prevention

12. Applicable Requirement: Should this stationary source become subject to the accidental release prevention regulations in 40 CFR Part 68, then the permittee must submit a risk management plan (RMP) by the date specified in 40 CFR 68.10 and comply with the plan and all other applicable Part 68 requirements. [40 CFR Part 68]

Emissions Unit Specific Emission Limits and Standards:

Table 3: Emission Units Natural Gas Engine Requirements

Applicable Requirement	Condition Number	Pollutant/ Parameter	Limit/Standard	Testing Condition	Monitoring Condition	Recordkeeping Condition
OAR 340-208-0110(4)	13	Visible Emissions	20% opacity, 6 minute avg.	21	21	29
OAR 340-226-0210(2)(b)(A)	15	Particulate	0.10 gr/dscf	31	28	29
40 CFR 60.4233 Subpart JJJJ Table 1 (Digester Biogas)	22	NO_x	2.0 g/HP-hr (150 ppmvd at 15% O_2)	Table 8	28	29
	23	CO	5.0 g/HP-hr (610 ppmvd at 15% O_2)		28	29
	24	VOC	1.0 g/HP-hr, excluding formaldehyde, as propane (80 ppmvd at 15% O_2)		28	29
40 CFR 60.4233 Subpart JJJJ Table 1 (Natural Gas)	25	NO_x	1.0 g/HP-hr (82 ppmvd at 15% O_2)	30 Table 8	28	29
	26	CO	2.0 g/HP-hr (270 ppmvd at 15% O_2)		28	29
	27	VOC	0.7 g/HP-hr, excluding formaldehyde, as propane (60 ppmvd at 15% O_2)		28	29

Table 4: Emission Units Biogas Flare Requirements

Applicable Requirement	Condition Number	Pollutant/ Parameter	Limit/Standard	Testing Condition	Monitoring Condition	Recordkeeping Condition
OAR 340-208-0110(4)	13	Visible Emissions	20% opacity, 6 minute avg.	19	21	20
OAR 340-228-0210(2)(b)(B) (Existing Flares)	14	Particulate	0.14 gr/dscf	19	NA	20
OAR 340-228-0210(2)(c) (Flares constructed on or after April 16, 2015)	16	Particulate	0.10 gr/dscf	19	NA	20

Table 5: Emission Units Gas Treatment System (TAILGAS) Requirements

Applicable Requirement	Condition Number	Pollutant/ Parameter	Limit/Standard	Testing Condition	Monitoring Condition	Recordkeeping Condition
OAR 340-222-0040 through OAR 340-222-0043	NA	NA	NA	19	38.b	32

Table 6: Emission Units Natural Gas Boiler Requirements

Applicable Requirement	Condition Number	Pollutant/ Parameter	Limit/Standard	Testing Condition	Monitoring Condition	Recordkeeping Condition
OAR 340-208-0110(4)	13	Visible Emissions	20% opacity, 6 minute avg.	19	21	34
OAR 340-228-0210(2)(c)	18	Particulate	0.10 gr/dscf	19	NA	34
40 CFR 60.48c (g)(2) Subpart Dc	NA	NA	NA	19	34	34

Table 7: Emission Units Fiber Dryer Requirements

Applicable Requirement	Condition Number	Pollutant/ Parameter	Limit/Standard	Testing Condition	Monitoring Condition	Recordkeeping Condition
OAR 340-208-0110(4)	13	Visible Emissions	20% opacity, 6 minute avg.	31	21	33
OAR 340-226-0210(2)(c)	17	Particulate	0.10 gr/dscf	31	NA	33

13. Applicable Requirement: The permittee shall not cause or allow the emissions of any air contaminant into the atmosphere with an average opacity greater than 20% during any 6-minute block. [OAR 340-208-0110 (4)]

14. Applicable Requirement: The permittee shall not cause or allow the emissions from the Flares (SRT, PFD1 and PFD2) to exceed particulate matter emissions of 0.14 gr/dscf. [OAR 340-226-0210(2)(b)(B)]

15. Applicable Requirement: The permittee shall not cause or allow emissions of particulate matter in excess of the following limits for the emission units from emission units (ENG1, ENG2, ENG3) in accordance with the applicable 0.10 grain per dry standard cubic foot, corrected to 50% excess air (Total Particulate Matter). [OAR 340-226-0210(2)(b)(A)]

16. Applicable Requirement: The permittee shall not cause or allow emissions of particulate matter in excess of the following limits for the emission units from emission units (FL-1, and FL-2) in accordance with the applicable 0.10 grain per dry standard cubic foot, corrected to 50% excess air (Total Particulate Matter). [OAR 340-226-0210(2)(c)]

17. Applicable Requirement: The permittee shall not cause or allow emissions of particulate matter in excess of the following limits for the emission unit Fiber Dryer (DRYER) in accordance with the applicable 0.10 grain per dry standard cubic foot, corrected to 50% excess air (Total Particulate Matter). [OAR 340-226-0210(2)(c)]

18. Applicable Requirement: The permittee shall not cause or allow the emissions from the Boiler (BOILER), to exceed particulate matter emissions of 0.10 gr/dscf, corrected to 50% excess air. [OAR 340-226-0210(2)(c)]

19. Testing Requirement: No source testing is required for the emission units Flares (SRT, PFD1, PFD2, FL-1 and FL-2), gas treatment system (TAILGAS), and the Boiler (BOILER). However, if testing were performed for compliance purposes, the permittee would be required to use the test methods identified in DEQ's Source Sampling Manual.

20. Recordkeeping Requirement: The permittee shall maintain the following records for each of the emission unit Flares (SRT, PFD1, PFD2, FL-1 and FL-2):

20.a. The monthly average of biogas combusted (scf) at each flare; and,
20.b. Total 12-month biogas combusted (scf) by flares.

21. Monitoring Requirement: At least once per quarter the permittee shall conduct an EPA Method 22 visible emissions test for the emission units (ENG1, ENG2, ENG3, flares, boiler, and fiber dryer). When visible emissions are observed for more than 3 minutes in any 30 minute observation period (or some other periods), corrective action must be initiated within 1-hour to bring the source into compliance with the applicable requirement. [OAR 340-212-0120(1)(a)]

21.a. The person conducting the observation does not have to be EPA Method 9 certified. However, the individual should be familiar with the procedures of EPA Method 9, including the use of proper location to observe visible emissions.
21.b. If the observer is unable to conduct the tests and/or surveys due to visual interference caused by other visible emission sources or due to adverse weather conditions such as fog, heavy rain or snow, the observer shall note such conditions on the observation form and make at least three attempts to conduct the tests and/or surveys at approximately 2-hour intervals throughout the day. The permittee must attempt to make the tests daily until a valid observation period is completed.

22. Applicable Requirement: While combusting digester biogas the permittee shall not cause or allow the emission units (ENG1, ENG2, and ENG3) emissions of oxides of nitrogen (NO_x) to exceed 2.0 g/HP-hr (150 ppmvd at 15% O_2). [40 CFR 60.4233(e), Table 1]

23. Applicable Requirement: While combusting digester biogas the permittee shall not cause or allow the emission units (ENG1, ENG2, and ENG3) emissions of carbon monoxide (CO) to exceed 5.0 g/HP-hr (610 ppmvd at 15% O_2). [40 CFR 60.4233(e), Table 1]

24. Applicable Requirement: While combusting digester biogas the permittee shall not cause or allow the emission units (ENG1, ENG2, and ENG3) emissions of volatile organic carbons (VOC) excluding formaldehyde, to exceed 1.0 g/HP-hr, as propane (80 ppmvd at 15% O_2). [40 CFR 60.4233(e), Table 1]

25. Applicable Requirement: When combusting natural gas, the permittee shall not cause or allow the emission units (ENG1, ENG2, and ENG3) emissions of oxides of nitrogen (NO_x) to exceed 1.0 g/HP-hr (82 ppmvd at 15% O_2). [40 CFR 60.4233(e), Table 1]

26. Applicable Requirement: When combusting natural gas, the permittee shall not cause or allow the emission units (ENG1, ENG2, and ENG3) emissions of carbon monoxide (CO) to exceed 2.0 g/HP-hr (270 ppmvd at 15% O_2). [40 CFR 60.4233(e), Table 1]

27. Applicable Requirement: When combusting natural gas, the permittee shall not cause or allow the emission units (ENG1, ENG2, and ENG3) emissions of volatile organic carbons (VOC) excluding formaldehyde, to exceed 0.7 g/HP-hr, as propane (60 ppmvd at 15% O_2). [40 CFR 60.4233(e), Table 1]

28. Monitoring Requirement: The permittee must perform preventative maintenance on the engines that follows the manufacturer's recommended guidelines and frequency, but consist of a minimum of inspection, servicing and/or replacement of air cleaners, spark or glow plugs (depending on engine type), and ignition systems as necessary. [OAR 340-218-0050(3)(a), 40 CFR 60.4243(b)(1)]

29. Recordkeeping Requirement: The permittee shall maintain the following records for emission units ENG1, ENG2 and ENG3: [40 CFR 60.4245(a)]

29.a. Hours of operation and electrical energy produced during normal operation;

29.b. Hours of operation and electrical energy produced during alternate operating scenario;
29.c. Monthly (scf) of digester biogas or natural gas combusted for each engine during normal operation;
29.d. Monthly (scf) of natural gas combusted for each engine during alternate operating scenario (AOS);
29.e. All visible emissions tests and surveys, including date, time, observer, observations, results, and any corrective actions taken; and,
29.f. All preventative maintenance work performed.

30. Testing Requirement: Source testing for compliance with NSPS Subpart JJJJ standards is required for each engine emission unit (ENG1, ENG2 and ENG3) when combusting natural gas. Testing must be performed in accordance with Conditions 41 and 42. The permittee shall demonstrate compliance with the NO_x, CO and VOC emission limits in Conditions 25, 26 and 27 respectively using the following testing methods: [40 CFR 60.4244, Table 2 & 40 CFR 60.4243(b)(2)(ii)]

Table 8: NSPS Subpart JJJJ Compliance Source Testing

EU ID	Monitoring Point	Pollutant	Test Method	Minimum Frequency
Units ENG1, ENG2 & ENG3	Engine Exhaust	NO_x	EPA Method 20, 7E	Each engine unit – within 60 days of maximum production but not more than 180 days after switching to natural gas, then test each engine every 8760 hrs or 3 years, whichever comes first.
		CO	EPA Method 10	
		VOC	EPA Method 18 and 25A; or EPA Method 25A (dual FID with a cutter); or ALT Method 106; or EPA Method 320	

31. The permittee shall conduct emission factor verification testing in accordance with the Department's Source Sampling Manual for the pollutants listed below, using the following test methods and minimum test frequencies. Testing must be in accordance with Conditions 41 and 43:

Table 9: Emission Factor Verification Source Testing at Dryer Exhaust Stack

EU ID	Monitoring Point	Pollutant	Test Method	Minimum Frequency
DRYER	Dryer Exhaust	NO_x	EPA Method 20, 7E	Twice per permit term: First test within 60 days of maximum production but not more than 180 days after startup; the second by the 48th month of the permit issuance date
		CO	EPA Method 10	
		VOC	SCAQMD 25.3 or equivalent	
		PM	DEQ Method 7	

32. Recordkeeping Requirement: The permittee shall monitor and maintain the records for the total monthly biogas treated (scf) by the Gas Treatment System (TAILGAS):

33. Recordkeeping Requirement: The permittee shall maintain the following records for the fiber dryer (DRYER) emission unit:

33.a. Hours of operation of the unit;
33.b. Total Monthly natural gas (scf) combusted in the unit;
33.c. Fiber throughput (tons/yr);
33.d. Scrubber water flow rate; and,
33.e. Pressure drops across the cyclone and baghouse.

34. Recordkeeping Requirement: The permittee shall maintain the following records for the Boiler (BOILER) emission unit:

34.a. Hours of operation of the unit; and,
34.b. Total Monthly natural gas (scf) combusted in the unit.

Insignificant Activities Emission Limits and Standards

35. DEQ acknowledges that insignificant emissions units (IEUs) identified by rule as either categorically insignificant activities or aggregate insignificant emissions as defined in OAR 340-200-0020 exist at facilities required to obtain an Oregon Title V Operating Permit. IEUs must comply with all applicable requirements. In general, the requirements that could apply to IEUs are incorporated as follows:

35.a. OAR 340-208-0110 (20% opacity for non-fugitive sources);
35.b. OAR 340-226-0210 (0.10 gr/dscf for non-fugitive, non-fuel burning equipment);
35.c. OAR 340-226-0310 (process weight limit for non-fugitive, non-fuel burning process equipment); and,
35.d. OAR 340-228-0210 (0.10 gr/dscf corrected to 12% CO_2 or 50% excess air for fuel burning equipment)

36. Unless otherwise specified in this permit or an applicable requirement, DEQ is not requiring any testing, monitoring, recordkeeping or reporting for the applicable emissions limits and standards that apply to IEUs. However, if testing were performed for compliance purposes, the permittee would be required to use the test methods identified in and perform the testing in accordance with DEQ's Source Sampling Manual.

PLANT SITE EMISSION LIMITS

37. The plant site emissions (tons/year) must not exceed the following limits for any 12 consecutive calendar month period: [OAR 340-222-0040 through OAR 340-222-0043]

Table 10: Plant Site Emission Limits

Pollutant	tons/yr
PM	24
PM_{10}	14
$PM_{2.5}$	9
SO_2	39
NO_x	39
CO	151
VOC	39
GHG (CO_2e)	74,000

38. Monitoring Requirement: The permittee must determine compliance with the Plant Site Emission Limits established in Condition 37 of this permit by conducting monitoring and calculations for each 12-month period in accordance with the following procedures, test methods and frequencies for all pollutants:

38.a. The permittee must calculate emissions except for GHG emissions using the following formula, process parameters, and emission factors:

$$E = P_{eu} \times EF_{eu} \times K$$

Where: E = Pollutant emissions in lbs/month and tons/yr.
P_{eu} = Process parameter identified in Table 11;

EF_{eu} = Emission factor identified for each emissions unit and pollutant in Table 11;
K = Conversion constant: 1 lb/lb for monthly emissions calculations; 1 ton/2,000 lbs for annual emissions calculations.

38.b. The permittee must calculate GHG emissions from the TAILGAS treatment system using the following formula, process parameters, and emission factor:

$$E = F_{eu} \times EF_{eu}$$

Where:
E = Pollutant emissions in lbs/month and tons/yr.
F_{eu} = Emission unit flow rate in million cubic feet per month and year;
EF_{eu} = Emission factor identified in Table 11.

38.c. The permittee must calculate GHG emissions from fuel combustion sources; the permittee must calculate GHG Emission using the following formula, process parameters, and emission factors:

$$E = \sum_{pol} (F_{eu} \times HHV_{pol} \times EF_{pol} \times GW_{pol} \times K)$$

Where:
E = CO_2e emissions in tons/month and tons/yr.
F_{eu} = Emission unit fuel flow rate in million cubic feet per month and year;
HHV_{pol} = Annual Average High Heating Value for each fuel in Million British Thermal Units per cubic feet identified in Table 12;
EF_{pol} = Emission factor identified in Table 12;
GW_{pol} = CO_2e equivalent global warming potential identified for each pollutant In Table 12;
K = Conversion constant: 1 metric tonne/1.102311 short ton. Conversion constant 1000 kg/metric tonne

38.d. The emission factors and fuel parameters listed in Table 11 and Table 12 are not enforceable limits unless otherwise specified in the permit. Compliance with the PSELs must only be determined by calculations contained in this condition.

39. Recordkeeping Requirement: The permittee must maintain records of the monthly PSEL calculations and any supporting information.

EMISSION FEES

40. Emission fees will be based on the Plant Site Emission Limits, unless the permittee elects to report actual emissions as defined in OAR 340-220-120 for one or more permitted processes/pollutants. If the permittee reports actual emissions for one or more permitted processes/pollutants, the permitted emissions for the remaining permitted processes/pollutants will be based on OAR 340-220-0090.

Table 11: PSEL Emission Factors

Emission Source Description	Throughput Type [Units]	PM	PM_{10}	$PM_{2.5}$	SO_2	NO_X	CO	VOC	GHG CO_2e
ENG1[(a)]	(lbs/hr)	0.85	0.85	0.85	0.26	2.89	10.26	0.54	[(d)]
ENG2[(a)]		1.13	1.13	1.13	0.08	2.76	11.44	0.56	[(d)]
ENG3[(a)]		0.41	0.41	0.41	0.08	0.74	11.05	0.54	[(d)]
ENG1-AOS		0.85	0.85	0.85	0.26	2.89	10.26	0.54	[(d)]
ENG2-AOS		1.13	1.13	1.13	0.08	2.76	11.44	0.56	[(d)]
ENG3-AOS		0.41	0.41	0.41	0.08	0.74	11.05	0.54	[(d)]
TAILGAS [(b)]	(tons/MMscf)	---	---	---	---	---	---	---	23.4
FLARES[(c)]	(lbs/MMscf)	9.0	9.0	9.0	97.8	23.4	27.6	84	[(d)]
BOILER		7.5	7.5	7.5	0.6	70	37.5	3.6	[(d)]
DRYER[(e)]		247.3	247.3	247.3	0.6	100	84	169	[(d)]
BEDDING	(lbs/BDT)	0.02	0.02	0.01	---	---	---	---	[(d)]
UPR	(lbs/hr)	0.83	0.22	0.02	---	---	---	---	[(d)]

(a) These emission factors are to be used when burning biogas fuel in the engines. When combusting natural gas, only the $PM/PM_{10}/PM_{2.5}$ emission factors for ENG1, ENG2, and ENG3 are combined in the DRYER emission factors.
(b) Measured as the amount of total digester biogas treated in the system.
(c) Measured as total digester gasses (MMscft) to the flares (SRT, PFD1, PFD2, FL-1 and FL-2).
(d) GHG emission for fuel combustion sources are calculated using Table 12.
(e) Measured as total natural gas fired in the supplementary dryer burner. ENG emission factors are used for all crietria pollutants with the exception of the $PM/PM_{10}/PM_{2.5}$ emission factors.

Table 12: Fuel Parameters for Fuel Combustion GHG Emissions Calculations

Fuel	MMBtu/ scf	Emission Factors (Kg/mmBtu)			Global Warming Potential			Short Ton Conversion	CO_2e Emission Factor
		CH_4	CO_2	N_2O	CH_4	CO_2	N_2O	ton/metric ton	tons/MMscf
Natural Gas	0.001026	0.001	53	0.0001	25	1	298	1.10231131	60.07
Biogas	0.00066	0.001	53	0.0001	25	1	298	1.10231131	37.79

GENERAL TESTING REQUIREMENTS

41. Unless otherwise specified in this permit, the permittee must conduct all testing in accordance with DEQ's Source Sampling Manual. [OAR 340-212-0120] [40 CFR §60.8]

41.a. Unless otherwise specified by a state or federal regulation, the permittee must submit a source test plan to DEQ at least 30 days prior to the date of the test. The test plan must be prepared in accordance with the Source Sampling Manual and address any planned variations or alternatives to prescribed test methods. The permittee should be aware that if significant variations are requested, it may require more than 30 days for DEQ to grant approval and may require EPA approval in addition to approval by DEQ.

41.b. Only regular operating staff may adjust the processes or emission control device parameters during a compliance source test and within two (2) hours prior to the tests. Any operating adjustments made during a compliance source test, which are a result of consultation during the tests with source testing personnel, equipment vendors or consultants, may render the source test invalid.

41.c. Unless otherwise specified by permit condition or DEQ approved source test plan, all compliance source tests must be performed as follows:
  41.c.i. At least 90% of the design capacity for new or modified equipment;
  41.c.ii. At least 90% of the maximum operating rate for existing equipment; or
  41.c.iii. At 90 to 110% of the normal maximum operating rate for existing equipment. For purposes of this permit, the normal maximum operating rate is defined as the 90th percentile of the average hourly operating rates during a 12 month period immediately preceding the source test. Data supporting the normal maximum operating rate must be included with the source test report.

41.d. Each source test must consist of at least three (3) test runs and the emissions results must be reported as the arithmetic average of all valid test runs. If for reasons beyond the control of the permittee a test run is invalid, DEQ may accept two (2) test runs for demonstrating compliance with the emission limit or standard.

41.e. Source test reports prepared in accordance with DEQ's Source Sampling Manual must be submitted to DEQ within 60 days of completing any required source test, unless a different time period is approved in the source test plan submitted prior to the source test.

42. The permittee must demonstrate compliance with the respective NO_x, CO and VOC NSPS Subpart JJJJ limits in Conditions 25, 26 and 27 testing as required by Table 8 of Condition 30 in accordance with 40 CFR 60.4244. Each individual engine shall demonstrate compliance at the exhaust stack prior to the fiber dryer as follows:

42.a. The permittee shall conduct an initial source test on ENG-1, ENG-2 and ENG-3 (Condition 30, Table 8) within 60 days after achieving the maximum production rate but not later than 180 days after initial startup of combusting natural gas to demonstrate compliance with NSPS Subpart JJJJ limits identified in Conditions 25, 26 and 27. Subsequent compliance testing for each engine is required every 8,760 hours of operation or 3 years, whichever comes first. [40 CFR 60.4243(a)(2)(iii)]

42.b. The following test methods are to be used: EPA Method 7E for measuring NO_X emissions, EPA Method 10 for measuring CO emissions, EPA Method 25A or other method approved by DEQ for measuring VOC emissions, and EPA Method 7 for particulate matter.

42.c. Testing required in Condition 30 shall be performed in accordance with Condition 41.c;

42.d. Visible emissions must be monitored and recorded as measured by EPA Method 9 for a period of at least six minutes during or within 30 minutes before or after each test run; and,

42.e. The permittee shall monitor and record the following information during each test:
  42.e.i. Date, time, emissions unit and monitoring point identification;
  42.e.ii. Fuel flow (scfm natural gas);
  42.e.iii. Temperature of the stack;
  42.e.iv. Load on natural gas engines (bhp-hr, kW);
  42.e.v. NO_x, CO, and VOC emission results are to be provided in lbs/hr and g/bhp-hr; and,
  42.e.vi. PM emission results are to be provided in lbs/hr and gr/dscft, corrected to 50% excess air.

43. The permittee must perform emission factor (Table 11) verification testing as required by Table 9 of Condition 31 for the fiber dryer (DRYER) exhaust stack as follows:

43.a. The permittee shall conduct a source test on fiber dryer (DRYER) exhaust stack within 60 days after achieving the maximum production rate but not later than 180 days after initial startup.

43.b. The approved test methods listed in Table 9 of Condition 31 are to be used for emission factor verification;

43.c. Emission factor verification testing must be performed twice during the permit term in accordance with Condition 31 and Table 9;

43.d. Testing required in Condition 31 shall be performed in accordance with Condition 41.c with all engines and boiler operating at maximum loads;

43.e. Visible emissions must be monitored and recorded as measured by EPA Method 9 for a period of at least six minutes during or within 30 minutes before or after each test run; and,

43.f. The permittee shall monitor and record the following information during each test:

43.f.i. Date, time, emissions unit and monitoring point identification;

43.f.ii. Fuel flow to each engine and the boiler (scfm natural gas);

43.f.iii. Fiber throughput rate (lbs/hr); dryer temperatures (In, Out); cyclone and baghouse pressure drop, and Scrubber water flow rate (gallons/hr).

43.f.iv. Temperature of the dryer stack;

43.f.v. Load on natural gas engines (bhp-hr, kW);

43.f.vi. NO_x and CO emission results are to be provided in lbs/hr and lbs/MMscf natural gas; and,

43.f.vii. VOC emission results are to be provided in lbs/hr and lbs/MMscf natural gas.

43.f.viii. PM emission results are to be provided in gr/dscft, lbs/hr, and lbs/MMscf natural gas.

GENERAL MONITORING AND RECORDKEEPING REQUIREMENTS

General Monitoring Requirements:

44. The permittee must not knowingly render inaccurate any required monitoring device or method. [OAR 340-218-0050(3)(a)(E)]

45. The permittee must use the same methods to determine compliance as those used to determine actual emissions for fee purposes and can be no less rigorous than the requirements of OAR 340-218-0080. [OAR 340-218-0050(3)(a)(F)]

46. The permittee must comply with the monitoring requirements on the date of permit issuance unless otherwise specified in the permit or an applicable requirement. [OAR 340-218-0050(3)(a)(G)]

General Recordkeeping Requirements

47. The permittee must maintain the following general records of testing and monitoring required by this permit: [OAR 340-218-0050(3)(b)(A)]

47.a. The date, place as defined in the permit, and time of sampling or measurements;

47.b. The date(s) analyses were performed;

47.c. The company or entity that performed the analyses;

47.d. The analytical techniques or methods used;

47.e. The results of such analyses;

47.f. The operating conditions as existing at the time of sampling or measurement; and

47.g. The records of quality assurance for continuous monitoring systems (including but not limited to quality control activities, audits, calibration drift checks).

48. Unless otherwise specified by permit condition, the permittee must make every effort to maintain 100 percent of the records required by the permit. If information is not obtained or recorded for legitimate reasons (e.g., the monitor or data acquisition system malfunctions due to a power outage), the missing record(s) will not be considered a permit deviation provided the amount of data lost does not exceed 10% of the averaging periods in a reporting period or 10% of the total operating hours in a reporting period, if no averaging time is specified. Upon discovering a required record is missing, the permittee must document the reason for the missing record. In addition, any missing record that can be recovered from other available information will not be considered a missing record. [OAR 340-214-0110, 340-214-0114, and 340-218-0050(3)(b)]

49. The permittee must comply with the recordkeeping requirements on the date of permit issuance unless otherwise specified in the permit or an applicable requirement. [OAR 340-218-0050(3)(b)(C)]

50. Unless otherwise specified, the permittee must retain records of all required monitoring data and support information for a period of at least five (5) years from the date of the monitoring sample, measurement, report or application. Support information includes all calibration and maintenance records and all original strip-chart recordings (or other original data) for continuous monitoring instrumentation, and copies of all reports required by the permit. All existing records required by the previous Air Contaminant Discharge Permit or Oregon Title V Operating Permit must also be retained for five (5) years from the date of the monitoring sample, measurement, report or application. [OAR 340-218-0050(b)(B)]

REPORTING REQUIREMENTS

General Reporting Requirements

51. Excess Emissions Reporting: The permittee must report all excess emissions as follows: [OAR 340-214-0300 through 340-214-0360]

- 51.a. Before 9AM of the following day notify DEQ of an excess emission event by phone, email or facsimile; and
- 51.b. Within 15 days of the excess emissions event, submit a written report that contains the following information: [OAR 340-214-0340(1)]
  - 51.b.i. The date and time of the beginning of the excess emissions event and the duration or best estimate of the time until return to normal operation;
  - 51.b.ii. The date and time the permittee notified DEQ of the event;
  - 51.b.iii. The equipment involved;
  - 51.b.iv. Whether the event occurred during planned startup, planned shutdown, scheduled maintenance, or as a result of a breakdown, malfunction or emergency;
  - 51.b.v. Steps taken to mitigate emissions and corrective action taken, including whether the approved procedures for a planned startup, shutdown or maintenance activity were followed;
  - 51.b.vi. The magnitude and duration of each occurrence of excess emissions during the course of an event and the increase over normal rates or concentrations as determined by continuous monitoring or best estimate (supported by operating data and calculations);
  - 51.b.vii. The final resolution of the cause of the excess emissions; and
  - 51.b.viii. Where applicable, evidence supporting any claim that emissions in excess of technology-based limits were due to any emergency pursuant to OAR 340-214-0360.
- 51.c. In the event of any excess emissions which are of a nature that could endanger public health and occur during non-business hours, weekends or holidays, the permittee must immediately notify DEQ by calling the Oregon Emergency Response System (OERS). The current number is 1-800-452-0311.
- 51.d. If startups, shutdowns or scheduled maintenance may result in excess emissions, the permittee must submit startup, shutdown or scheduled maintenance procedures used to minimize excess emissions to DEQ for prior authorization, as required in OAR 340-214-0310 and 340-214-0320. New or modified procedures must be received by DEQ in writing at least 72 hours prior to the first occurrence of the excess emission event. The permittee must abide by the approved procedures and have a copy available at all times.
- 51.e. The permittee must notify DEQ of planned startup/shutdown or scheduled maintenance events.
- 51.f. The permittee must continue to maintain a log of all excess emissions in accordance with OAR 340-214-0340(3). However, the permittee is not required to submit the detailed log with the semi-annual and annual monitoring reports. The permittee is only required to submit a brief summary listing the date, time and the affected emissions units for each excess emission that occurred during the reporting period. [OAR 340-218-0050(3)(c)]

52. Permit Deviations Reporting: The permittee must promptly report deviations from permit requirements that do not cause excess emissions, including those attributable to upset conditions, as defined in the permit, the probable cause of such deviations, and any corrective actions or preventive measures taken. "Prompt" means within 15 days of the deviation. Deviations that cause excess emissions, as specified in OAR 340-214-0300 through 340-214-0360 must be reported in accordance with Condition 51.

53. The permittee must notify DEQ in writing with the date the new flares, boiler, dyer, and tailgas processes have started operations and when the existing engines have begun combusting natural gas. The permittee must notify DEQ in writing with the date when each existing flare (SRT, PFD1, & PFD2) has been removed and is no longer in service. These notifications must be submitted no later than seven (7) days of each initial startup or removal.

54. All required reports must be certified by a responsible official consistent with OAR 340-218-0040(5). [OAR 340-218-0050(3)(c)(D)]

55. Reporting requirements must commence on the date of permit issuance unless otherwise specified in the permit. [OAR 340-218-0050(3)(c)(E)]

Addresses of regulatory agencies are the following, unless otherwise instructed:

DEQ – Eastern Region 475 NE Bellevue Dr., Suite 110 Bend, OR 97701 541-388-6146	DEQ – Air Quality Division 700 NE Multnomah St., Suite #600 Portland, OR 97232 503-229-5359	Clean Air Act Compliance Manager US EPA Region 10, MS: OCE-101 1200 Sixth Avenue, Suite 900 Seattle, WA 98101

Semi-Annual and Annual Reports

56. The permittee must submit three (3) copies of reports of any required monitoring at least every 6 months, completed on forms approved by DEQ. Six month periods are January 1 to June 30, and July 1 to December 31. One copy of the report must be submitted to the EPA and two copies to the DEQ regional office. All instances of deviations from permit requirements must be clearly identified in such reports: [OAR 340-218-0050(3)(c)(A) and 340-218-0080(6)(d)]]

56.a. The first semi-annual report is due on **July 30** and must include the semi-annual compliance certification; OAR 340-218-0080.

56.b. The annual report is due on **February 15** and must consist of the following:

- 56.b.i. Monthly and annual volume of biogas and/or natural gas combusted by each engine during normal operation and alternate operation, and by the heater, boiler, and dryer;
- 56.b.ii. Monthly and annual hourly percent operating load of each engine. The average hourly operational load is to be reported using the following: 0 to 25%; 26% to 50%; 51% to 75%; or 76% to 100% of maximum operating load;
- 56.b.iii. Monthly and annual volume of digester biogas combustion by each flare;
- 56.b.iv. Monthly and annual volume of digester biogas treated in the gas treatment system;
- 56.b.v. Monthly and annual bedding generated (bone dry tons);
- 56.b.vi. Monthly and annual hours of operation of each engine during normal operation and alternate operation, and each flare, gas treatment system, heater, boiler, and dryer;
- 56.b.vii. Monthly and annual electricity generated by each engine;
- 56.b.viii. Identify and summarize preventive maintenance performed on each engine as required in Condition 28;
- 56.b.ix. Annual and 12-month rolling emissions in accordance with Condition 38.a and Table 11;

56.b.x. Annual and 12-month rolling GHG emissions in accordance with Condition 38.b, 38.c, and 58;
56.b.xi. The emission fee report; [OAR 340-220-0100]
56.b.xii. A summary of the excess emissions upset log; [OAR 340-214-0340]
56.b.xiii. A summary of each nuisance complaint received as required by Condition 10; and,
56.b.xiv. The second semi-annual compliance certification. [OAR 340-218-0080]

57. The semi-annual compliance certification must include the following (provided that the identification of applicable information may cross-reference the permit or previous reports, as applicable): [OAR 340-218-0080(6)(c)]

57.a. The identification of each term or condition of the permit that is the basis of the certification;
57.b. The identification of the method(s) or other means used by the permittee for determining the compliance status with each term and condition during the certification period, and whether such methods or other means provide continuous or intermittent data. Such methods and other means must include, at a minimum, the methods and means required under OAR 340-218-0050(3). *Note: Certification of compliance with the monitoring conditions in the permit is sufficient to meet this requirement, except when the permittee must certify compliance with new applicable requirements that are incorporated by reference into the permit. When certifying compliance with new applicable requirements that are not yet in the permit, the permittee must provide the information required by this condition.* If necessary, the permittee must identify any other material information that must be included in the certification to comply with Section 113(c)(2) of the FCAA, which prohibits knowingly making a false certification or omitting material information;
57.c. The status of compliance with terms and conditions of the permit for the period covered by the certification, including whether compliance during the period was continuous or intermittent. The certification must be based on the method or means designated in Condition 57.b of this permit. The certification must identify each deviation and take it into account in the compliance certification. The certification must also identify as possible exceptions to compliance any periods during which compliance is required and in which an excursion or exceedance, as defined under OAR 340-200-0020, occurred; and
57.d. Such other facts as DEQ may require to determine the compliance status of the source.

58. Greenhouse Gas Registration and Reporting: If the calendar year emission rate of greenhouse gases (CO_2e) is greater than or equal to 2,756 tons (2,500 metric tons), the permittee must register and report its greenhouse gas emissions with DEQ in accordance with OAR 340-215. The greenhouse gas report must be certified by the responsible official consistent with OAR 340-218-0040(5).

59. Notwithstanding any other provision contained in any applicable requirement, the permittee may use monitoring as required under OAR 340-218-0050(3) and incorporated into the permit, in addition to any specified compliance methods, for the purpose of submitting compliance certifications. [OAR 340-218-0080(6)(e)]

GENERAL CONDITIONS

G1. General Provision

Terms not otherwise defined in this permit have the meaning assigned to such terms in the referenced regulation.

G2. Reference materials

Where referenced in this permit, the versions of the following materials are effective as of the dates noted unless otherwise specified in this permit:

a. Source Sampling Manual; April 16, 2015 - State Implementation Plan Volume 3, Appendix A4;
b. Continuous Monitoring Manual; April 16, 2015 - State Implementation Plan Volume 3, Appendix A6; and
c. All state and federal regulations as in effect on the date of issuance of this permit.

G3. Applicable Requirements [OAR 340-218-0010(3)(b)]

Oregon Title V Operating Permits do not replace requirements in Air Contaminant Discharge Permits (ACDP) issued to the source even if the ACDP(s) have expired. For a source operating under a Title V permit, requirements established in an earlier ACDP remain in effect notwithstanding expiration of the ACDP or Title V permit, unless a provision expires by its terms or unless a provision is modified or terminated following the procedures used to establish the requirement initially. Source specific requirements, including, but not limited to TACT, RACT, BACT, and LAER requirements, established in an ACDP must be incorporated into the Oregon Title V Operating Permit and any revisions to those requirements must follow the procedures used to establish the requirement initially.

G4. Compliance [OAR 340-218-0040(3)(n)(C), 340-218-0050(6), and 340-218-0080(4)]

a. The permittee must comply with all conditions of this permit. Any permit condition noncompliance constitutes a violation of the Federal Clean Air Act and/or state rules and is grounds for enforcement action; for permit termination, revocation and re-issuance, or modification; or for denial of a permit renewal application. Any noncompliance with a permit condition specifically designated as enforceable only by the state constitutes a violation of state rules only and is grounds for enforcement action; for permit termination, revocation and re-issuance, or modification; or for denial of a permit renewal application.
b. Any schedule of compliance for applicable requirements with which the source is not in compliance at the time of permit issuance is supplemental to, and does not sanction noncompliance with the applicable requirements on which it is based.
c. For applicable requirements that will become effective during the permit term, the source must meet such requirements on a timely basis unless a more detailed schedule is expressly required by the applicable requirement.

G5. Masking Emissions

The permittee must not install or use any device or other means designed to mask the emission of an air contaminant that causes or is likely to cause detriment to health, safety, or welfare of any person or otherwise violate any other regulation or requirement. [OAR 340-208-0400] This condition is enforceable only by the State.

G6. Credible Evidence

Notwithstanding any other provisions contained in any applicable requirement, any credible evidence may be used for the purpose of establishing whether a person has violated or is in violation of any such applicable requirements. [OAR 340-214-0120]

G7. Certification [OAR 340-214-0110, 340-218-0040(5), 340-218-0050(3)(c)(D), and 340-218-0080(2)]

Any document submitted to DEQ or EPA pursuant to this permit must contain certification by a responsible official of truth, accuracy and completeness. All certifications must state that based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and, complete. The permittee must promptly, upon discovery, report to DEQ a material error or omission in these records, reports, plans, or other documents.

G8. Open Burning [OAR Chapter 340, Division 264]

The permittee is prohibited from conducting open burning, except as may be allowed by OAR 340-264-0020 through 340-264-0200.

G9. Asbestos [40 CFR Part 61, Subpart M (federally enforceable), OAR Chapter 340-248-0005 through 340-248-0180 (state-only enforceable) and 340-248-0205 through 340-248-0280]

The permittee must comply with OAR Chapter 340, Division 248, and 40 CFR Part 61, Subpart M when conducting any renovation or demolition activities at the facility.

G10. Stratospheric Ozone and Climate Protection [40 CFR 82 Subpart F, OAR 340-260-0040]

The permittee must comply with the standards for recycling and emissions reduction pursuant to 40 CFR Part 82, Subpart F, Recycling and Emissions Reduction.

G11. Permit Shield [OAR 340-218-0110]

a. Compliance with the conditions of the permit is deemed compliance with any applicable requirements as of the date of permit issuance provided that:
   i. Such applicable requirements are included and are specifically identified in the permit, or
   ii. DEQ, in acting on the permit application or revision, determines in writing that other requirements specifically identified are not applicable to the source, and the permit includes the determination or a concise summary thereof.

b. Nothing in this rule or in any federal operating permit alters or affects the following:
   i. The provisions of ORS 468.115 (enforcement in cases of emergency) and ORS 468.035 (function of department);
   ii. The liability of an owner or operator of a source for any violation of applicable requirements prior to or at the time of permit issuance;
   iii. The applicable requirements of the national acid rain program, consistent with section 408(a) of the FCAA; or
   iv. The ability of DEQ to obtain information from a source pursuant to ORS 468.095 (investigatory authority, entry on premises, status of records).

c. Sources are not shielded from applicable requirements that are enacted during the permit term, unless such applicable requirements are incorporated into the permit by administrative amendment, as provided in OAR 340-218-0150(1)(h), significant permit modification, or reopening for cause by DEQ.

G12. Inspection and Entry [OAR 340-218-0080(3)]

Upon presentation of credentials and other documents as may be required by law, the permittee must allow DEQ, or an authorized representative (including an authorized contractor acting as a representative of the EPA Administrator), to perform the following:

a. Enter upon the permittee's premises where an Oregon Title V Operating Permit program source is located or emissions-related activity is conducted, or where records must be kept under the conditions of the permit;
b. Have access to and copy, at reasonable times, any records that must be kept under conditions of the permit;
c. Inspect, at reasonable times, any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under the permit; and

d. As authorized by the FCAA or state rules, sample or monitor, at reasonable times, substances or parameters, for the purposes of assuring compliance with the permit or applicable requirements.

G13. Fee Payment [OAR 340-220-0010, and 340-220-0030 through 340-220-0190]

The permittee must pay an annual base fee and an annual emission fee for particulates, sulfur dioxide, nitrogen oxides, and volatile organic compounds. The permittee must submit payment to the Department of Environmental Quality, Financial Services, 700 NE Multnomah St., Suite #600, Portland, OR 97232, within 30 days of date DEQ mails the fee invoice or August 1 of the year following the calendar year for which emission fees are paid, whichever is later. Disputes must be submitted in writing to DEQ. Payment must be made regardless of the dispute. User-based fees will be charged for specific activities (e.g., computer modeling review, ambient monitoring review, etc.) requested by the permittee.

G14. Off-Permit Changes to the Source [OAR 340-218-0140(2)]

a. The permittee must monitor for, and record, any off-permit change to the source that:
   i. Is not addressed or prohibited by the permit;
   ii. Is not a Title I modification;
   iii. Is not subject to any requirements under Title IV of the FCAA;
   iv. Meets all applicable requirements;
   v. Does not violate any existing permit term or condition; and
   vi. May result in emissions of regulated air pollutants subject to an applicable requirement but not otherwise regulated under this permit or may result in insignificant changes as defined in OAR 340-200-0020.
b. A contemporaneous notification, if required under OAR 340-218-0140(2)(b), must be submitted to DEQ and the EPA.
c. The permittee must keep a record describing off-permit changes made at the facility that result in emissions of a regulated air pollutant subject to an applicable requirement, but not otherwise regulated under the permit, and the emissions resulting from those off-permit changes.
d. The permit shield of Condition G11 does not extend to off-permit changes.

G15. Section 502(b)(10) Changes to the Source [OAR 340-218-0140(3)]

a. The permittee must monitor for, and record, any section 502(b)(10) change to the source, which is defined as a change that would contravene an express permit term but would not:

   i. Violate an applicable requirement;
   ii. Contravene a federally enforceable permit term or condition that is a monitoring, recordkeeping, reporting, or compliance certification requirement; or
   iii. Be a Title I modification.

b. A minimum 7-day advance notification must be submitted to DEQ and the EPA in accordance with OAR 340-218-0140(3)(b).
c. The permit shield of Condition G11 does not extend to section 502(b)(10) changes.

G16. Administrative Amendment [OAR 340-218-0150]

Administrative amendments to this permit must be requested and granted in accordance with OAR 340-218-0150. The permittee must promptly submit an application for the following types of administrative amendments upon becoming aware of the need for one, but no later than 60 days of such event:

a. Legal change of the registered name of the company with the Corporations Division of the State of Oregon, or
b. Sale or exchange of the activity or facility.

G17. Minor Permit Modification [OAR 340-218-0170]

The permittee must submit an application for a minor permit modification in accordance with OAR 340-218-0170.

G18. Significant Permit Modification [OAR 340-218-0180]

The permittee must submit an application for a significant permit modification in accordance with OAR 340-218-0180

G19. Staying Permit Conditions [OAR 340-218-0050(6)(c)]

Notwithstanding Conditions G16 and G17, the filing of a request by the permittee for a permit modification, revocation and re-issuance, or termination, or of a notification of planned changes or anticipated noncompliance does not stay any permit condition.

G20. Construction/Operation Modification [OAR 340-218-0190]

The permittee must obtain approval from DEQ prior to construction or modification of any stationary source or air pollution control equipment in accordance with OAR 340-210-0200 through OAR 340-210-0250.

G21. New Source Review Modification [OAR 340-224-0010]

The permittee may not begin construction of a major source or a major modification of any stationary source without having received an Air Contaminant Discharge Permit (ACDP) from DEQ and having satisfied the requirements of OAR 340, Division 224.

G22. Need to Halt or Reduce Activity Not a Defense [OAR 340-218-0050(6)(b)]

The need to halt or reduce activity will not be a defense. It will not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

G23. Duty to Provide Information [OAR 340-218-0050(6)(e) and OAR 340-214-0110]

The permittee must furnish to DEQ, within a reasonable time, any information that DEQ may request in writing to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit, or to determine compliance with the permit. Upon request, the permittee must also furnish to DEQ copies of records required to be retained by the permit or, for information claimed to be confidential, the permittee may furnish such records to DEQ along with a claim of confidentiality.

G24. Reopening for Cause [OAR 340-218-0050(6)(c) and 340-218-0200]

a. The permit may be modified, revoked, reopened and reissued, or terminated for cause as determined by DEQ.
b. A permit must be reopened and revised under any of the circumstances listed in OAR 340-218-0200(1)(a).
c. Proceedings to reopen and reissue a permit must follow the same procedures as apply to initial permit issuance and affect only those parts of the permit for which cause to reopen exists.

G25. Severability Clause [OAR 340-218-0050(5)]

Upon any administrative or judicial challenge, all the emission limits, specific and general conditions, monitoring, recordkeeping, and reporting requirements of this permit, except those being challenged, remain valid and must be complied with.

G26. Permit Renewal and Expiration [OAR 340-218-0040(1)(a)(D) and 340-218-0130]

a. This permit expires at the end of its term, unless a timely and complete renewal application is submitted as described below. Permit expiration terminates the permittee's right to operate.

b. Applications for renewal must be submitted at least 12 months before the expiration of this permit, unless DEQ requests an earlier submittal. If more than 12 months is required to process a permit renewal application, DEQ must provide no less than six (6) months for the owner or operator to prepare an application.

c. Provided the permittee submits a timely and complete renewal application, this permit will remain in effect until final action has been taken on the renewal application to issue or deny the permit.

G27. Permit Transference [OAR 340-218-0150(1)(d)]

The permit is not transferable to any person except as provided in OAR 340-218-0150(1)(d).

G28. Property Rights [OAR 340-200-0020 and 340-218-0050(6)(d)]

The permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations, except as provided in OAR 340-218-0110.

G29. Permit Availability [OAR 340-200-0020 and 340-218-0120(2)]

The permittee must have available at facility at all times a copy of the Oregon Title V Operating Permit and must provide a copy of the permit to DEQ or an authorized representative upon request.

ALL INQUIRIES SHOULD BE DIRECTED TO:
DEQ – Eastern Region Bend Office
475 NE Bellevue Dr., Suite 110
Bend, OR 97701
541-388-6146

State of Oregon Department of Environmental Quality

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
OREGON TITLE V OPERATING PERMIT
REVIEW REPORT

Eastern Region
475 NE Bellevue Dr., Suite 110
Bend, OR 97701

Source Information:

SIC	4911, 4932
NAICS	221119, 221210

Source Categories (Part and code)	Part B, 27 Part C, 4 & 5

Compliance and Emissions Monitoring Requirements:

Unassigned emissions	No	COMS	No
Emission credits	No	CEMS	No
Compliance schedule	No	PEMS	No
Source test [date(s)]	Within 60 days startup then 8,760 hrs/3yrs	Ambient monitoring	No

Reporting Requirements

Annual report (due date)	2/15	Monthly report (due dates)	No
Emission fee report (due date)	2/15	Excess emissions report	Yes
SACC (due date)	2/15, 7/30	Other reports (type)	No
Quarterly report (due dates)	No		

Air Programs

NSPS (list subparts)	A, Dc, JJJJ	TACT	No
NESHAP (list subparts)	ZZZZ	Title V	Yes
CAM	No	ACDP (SIP)	Yes
Regional Haze (RH)	No	Major HAP source	No
Synthetic Minor (SM)	No	Federal major source	No
Part 68 Risk Management	No	NSR	No
CFC	No	PSD	No
RACT	No	Acid Rain	No

TABLE OF CONTENTS

LIST OF ABBREVIATIONS USED IN THIS REVIEW REPORT 3
INTRODUCTION 4
PERMITTEE IDENTIFICATION 4
FACILITY DESCRIPTION 4
EMISSIONS UNIT AND POLLUTION CONTROL DEVICE IDENTIFICATION 6
EMISSION LIMITS AND STANDARDS, TESTING, MONITORING AND RECORDKEEPING 8
PLANT SITE EMISSION LIMITS 12
HAZARDOUS AIR POLLUTANTS 13
GENERAL BACKGROUND INFORMATION 13
COMPLIANCE HISTORY 13
SOURCE TEST RESULTS 13
PUBLIC NOTICE 15
ATTACHMENT 1: EMISSIONS DETAIL SHEETS 16

LIST OF ABBREVIATIONS USED IN THIS REVIEW REPORT

AQMA	Air Quality Management Area
ASTM	American Society of Testing and Materials
BDT	Bone Dry Ton
CEMS	Continuous Emissions Monitoring System
CFR	Code of Federal Regulations
CH_4	Methane (greenhouse gas)
CMS	Continuous Monitoring System
CO	Carbon Monoxide
CO_2e	Carbon Dioxide Equivalent
COMS	Continuous Opacity Monitoring System
DEQ	Oregon Department of Environmental Quality
dscf	dry standard cubic feet
EF	Emission Factor
EPA	United States Environmental Protection Agency
EU	Emissions Unit
FCAA	Federal Clean Air Act
GHG	Greenhouse Gas
gr/dscf	grains per dry standard cubic feet
HAP	Hazardous Air Pollutant
ID	Identification Code
I&M	Inspection and Maintenance
MB	Material Balance
Mlb	1000 Pounds
MM	Million
N_2O	Nitrous Oxide (greenhouse gas)
NA	Not Applicable
NESHAP	National Emission Standard for Hazardous Air Pollutants
NO_x	Oxides of Nitrogen
NSPS	New Source Performance Standard
NSR	New Source Review
O_2	Oxygen
OAR	Oregon Administrative Rules
ORS	Oregon Revised Statutes
O&M	Operation and Maintenance
Pb	Lead
PCD	Pollution Control Device
PEMS	Predictive Emissions Monitoring System
PM	Particulate Matter
PM_{10}	Particulate Matter less than 10 microns in size
$PM_{2.5}$	Particulate Matter less than 2.5 microns in size
PSD	Prevention of Significant Deterioration
PSEL	Plant Site Emission Limit
SO_2	Sulfur Dioxide
ST	Source Test
VE	Visible Emissions
VMT	Vehicle Mile Traveled
VOC	Volatile Organic Compound

INTRODUCTION

1. This is a Significant Permit Modification of the Oregon Title V Operating Permit issued to WOF PNW Threemile Project, LLC, issued on April 17, 2017 and scheduled to expire on April 1, 2022. The Oregon Title V Operating Permit is also being renewed with this permitting action.

2. In accordance with OAR 340-218-0120(1)(f), this Review Report is intended to provide the legal and factual basis for the draft permit conditions. In most cases, the legal basis for a permit condition is included in the permit by citing the applicable regulation. In addition, the factual basis for the requirement may be the same as the legal basis. However, when the regulation is not specific and only provides general requirements, this Review Report is used to provide a more thorough explanation of the factual basis for the draft permit conditions.

3. The following administrative amendments occurred since the permit was last renewed on April 17, 2017:

Date	Permit Revision or Notification	Brief Explanation
4/23/2018	Administrative Amendment	Change name of ownership to WOF PNW Threemile Project, LLC
2/16/2018	Type 2 Notice of Intent (No. 29698)	Upgrading and moving flares and biogas process
5/21/2018	Type 2 Notice of Intent (No. 30326)	Upgrading the manure digester fiber drying process

PERMITTEE IDENTIFICATION

4. WOF PNW Threemile Project (WOF PNW) owns and operates an anaerobic digester system, anaerobic gas treatment system, and a natural gas 5 megawatts (MW) electrical generation facility. The facility is located approximately twenty-one kilometers (thirteen miles) southwest of the City of Boardman, Oregon.

FACILITY DESCRIPTION

5. WOF PNW is a limited liability corporation that produces biogas that is currently used to operate three engine generator sets to generate electricity. The proposed permit modification authorizes WOF PNW to continue to produce biogas for the biogas-fueled generator engine sets while the individual engine generator sets are converted to combust only natural gas. This modification also approves WOF PNW to construct and operate a gas treatment system that will produce pipeline quality natural gas from the digester biogas. The electricity and natural gas produced at the facility will be sold to the grid and the off-site natural gas pipeline system or possibly used onsite. This modification includes monitoring, recordkeeping, and reporting requirements for the facility's biogas treatment system and the generator engine sets conversion to natural gas.

6. WOF PNW generates biogas by taking dairy manure, supplemented with a small amount of potato and other vegetable waste, and biologically processes the combined feedstock in an anaerobic digester. WOF PNW leases land from Threemile Canyon Farms and has a manure supply agreement with Columbia River Dairy. The potato and vegetable waste is trucked in from area processing facilities.

   The anaerobic digester provides an oxygen-free environment for microorganisms to break down the organics in the combined manure and potato/vegetable waste (feedstock). Once broken down, the microorganisms produce biogas, which is comprised of approximately 60 percent methane and 40 percent carbon dioxide. The anaerobic digester is sized and designed to produce biogas at a rate of up to 3,135 standard cubic feet per minute (scfm). As mentioned above, the digester biogas is currently directed to the engines for combustion. This permit modification will authorize the permittee to begin routing the digester biogas to a gas treatment system that removes hydrogen sulfide (H_2S), and then separates the digester biogas into pipeline grade natural gas and tail gas. The gas treatment system is designed to

upgrade 99.9% of incoming methane. The process begins with H_2S removal in an absorber, an aerobic (biological) reactor and a sulfur separation step. There will be no emissions associated with this step. The produced sulfur captured in wastewater will be piped to the lagoons for land application at agronomic rates.

The biogas will then be directed to the carbon dioxide (CO_2) removal unit, which consists of an absorption column and a stripper column. Heat is delivered to this process from a new 16.0 MM Btu/hr natural gas-fired boiler. In the absorption column, the CO_2 reacts with the absorption liquid to produce the upgraded product gas, which leaves the top of the column (99% by volume methane). The pipeline quality gas will be compressed before being piped off-site and delivered to the interstate natural gas pipeline. The CO_2 enriched absorption liquid is pumped to the stripper column for desorption of the CO_2 to produce the system tail gas (99.9% by volume CO_2). The tail gas leaves the stripper column from the top, is cooled in a condenser, and vented to the atmosphere, producing GHG emissions. Heat is recovered from the hot glycol from the gas clean-up system to preheat the digester feedstock. Emissions from this process are from the natural gas-fired boiler and from venting the tail gas to the atmosphere.

During upset conditions and for routine maintenance, biogas generated in the anaerobic digester will be directed to two on-site flares rather than being processed in the gas treatment system. The sole purpose of the flares is to ensure that no biogas is released to the atmosphere without being properly combusted. The flares are not intended to be used for extended periods of time as the gas treatment system is a proven technology with manufacturer assuming an uptime of 98.5%, meaning the flare would only operate 1.5% of the year. However, to be conservative, it is assumed that the treatment facility will be down for 3% of the year.

7. WOF PNW will begin to operate three converted natural gas-fueled generator engines, each with a rated output of 1,600 kW-hour. Electricity generated on site would be used at the facility or sold to the electrical grid. The engine flue gas will provide heat medium for the fiber dryer. The combined exhaust from the engines is to be routed to the intake of the fiber dryer where the heat will be used to evaporate water from the moist fiber. After exiting the dryer, the engine exhaust will pass through a cyclone separator, baghouse and a water mist scrubber before being routed to a single stack. If the fiber dryer is off line for any reason when the engines are burning natural gas, the exhaust will be routed directly to the atmosphere via a dump stack located in front of the fiber dyer. The dump stack will have no pollution controls. In order to be conservative, it is assumed that the dryer will be off line when the engines will be running for 3% of the year for this biological process to work properly, it is important to maintain proper temperatures for the feedstock and the anaerobic digester. Three plate heat exchangers using three different heat sources are used to achieve this temperature. The feedstock is first heated using plate heat exchangers where hot digester effluent provides the heat source. The second phase uses plate heat exchangers where hot glycol from the gas clean-up system provides the heat source. The final phase uses hot engine jacket water to provide the heat source.

8. When the feedstock has been fully processed by the anaerobic digester, the digester waste stream is separated into fiber and liquid through a series of screens, screw presses, and conveyor belt feeders. The fiber is either directed to the bedding storage building without drying or it is dried in a triple pass rotary dryer system that will be located in the bedding storage building. The product enters the dryer via a chute and follows the length of the dryer three times through three separate compartments of the dryer. The drying medium is provided through waste heat from engine exhaust, which will be supplemented by a new natural gas-fired heater (approximately 7.6 MM Btu/hr of supplemental heat). The fiber is discharged from the dryer through a duct and into a cyclone where the fiber is separated from the conveying air. Exhaust air from the dryer, comprised of the engine and heater exhaust along with any residual fiber from the dryer, exits the cyclone and is passed through a baghouse and a water mist scrubber prior to discharge to the atmosphere via a 60-ft stack. As mentioned above, the engine's exhaust will be routed directly to the atmosphere via a dump stack located in front of the dyer when the fiber dryer is down for maintenance.

The dried fiber is used as fiber bedding for the milk cows or as soil amendment on the Threemile Canyon Farms agriculture fields. The digested liquid waste stream from the screens and screw presses is returned to the Threemile Canyon Farms for subsequent use as fertilizer on their agricultural fields. The application of the digested liquid stream is under the control and managed by Threemile Canyon Farms in accordance with their Manure Management Plan.

9. The normal operating scenario for the upgraded facility will be to operate the three engines, the biogas treatment system, and the fiber dryer boiler. Tail gas will be released to the atmosphere and the product gas will be delivered to the natural gas pipeline or possibly used onsite. This operating scenario also results in the maximum facility-wide emissions.

10. There are approximately 300 feet of unpaved roads used at the facility by trucks to transport potato/vegetable waste to the potato pit and to transport dried fiber to the dairy farm. Water will be used as needed to control dust on the unpaved roads.

    Should WOF PNW Threemile Project, LLC cease operations, Columbia River Dairy would continue its business and manage its manure in accordance with its Oregon Department of Agriculture approved Manure Management Plan, as it did prior to the formation of WOF PNW Threemile Project, LLC.

EMISSIONS UNIT AND POLLUTION CONTROL DEVICE IDENTIFICATION

11. The emissions units at this facility are the following:

Emissions Unit (EU)	EU ID	EU Description	Pollutants Emitted	Pollution Controls
Engines	ENG1, ENG2, & ENG3	Engine-Generator Sets burning biogas	PM, PM_{10}, $PM_{2.5}$, NO_x, CO, SO_2, VOC, & GHGs	None
		Engine-Generator Sets when combusting natural gas (Includes: ENG1-AOS, ENG2-AOS, and ENG3-AOS operating scenarios).		Cyclone, Baghouse & Scrubber/None for ENG-AOS*
Anaerobic Digester	AD	Existing Short Retention Flare for digester		SRT
		Existing Plug Flow Flare for digester		PFD1
		Existing Backup Plug Flow Flare for digester		PFD2
		New flares for biogas treatment system		FL-1 & FL-2
Boiler	BOILER	16 MMBtu/hr natural gas fired boiler		None
Biogas Treatment System	TAILGAS	Gas Treatment System that removes CO_2 from the biogas to produce natural gas.	GHGs	None
Material Handling	MH	Existing Material Handling from Bedding Operations	PM, PM_{10}, $PM_{2.5}$	None
Fiber Dryer	DRYER	Digester fiber dryer that includes a natural gas 7.6 MMBtu/hr burner	PM, PM_{10}, $PM_{2.5}$, NO_x, CO, SO_2, VOC, & GHGs	Cyclone, Baghouse & Scrubber
Unpaved Roads	UPR	Fugitive dust from vehicle traffic on unpaved areas	PM, PM_{10}, $PM_{2.5}$	Water Application as needed
Aggregate Insignificant Activities	AI	Aggregate insignificant activities including emissions from material handling (MH) from the digester feedstock bedding, blowers and office heaters.	PM, PM_{10}, $PM_{2.5}$, NO_x, CO, SO_2, VOC, & GHGs	None

***** When engines are converted to combust natural gas, the emissions are to be directed through the DRYER. When the fiber dyer is off line, the natural gas engine exhaust will be routed directly to the atmosphere via a dump stack located in front of the dyer. The dump stack will have no pollution controls.

12. Categorically insignificant activities include the following:

- Constituents of a chemical mixture present at less than 1% by weight of any chemical or compound regulated under OAR Chapter 340, Divisions 200 through 268, excluding Divisions 248 and 262, or less than 0.1% by weight of any carcinogen listed in the U.S. Department of Health and Human Service's Annual Report on Carcinogens when usage of the chemical mixture is less than 100,000 pounds/year
- Evaporative and tail pipe emissions from on-site motor vehicle operation
- Distillate oil, kerosene and gasoline fuel burning equipment rated at less than or equal to 0.4 million Btu/hr
- Natural gas and propane burning equipment rated at less than or equal to 2.0 million Btu/hr
- Office activities
- Food service activities
- Janitorial activities
- Personal care activities
- Groundskeeping activities including, but not limited to building painting and road and parking lot maintenance
- On-site laundry activities
- On-site recreation facilities
- Instrument calibration
- Maintenance and repair shop
- Automotive repair shops or storage garages
- Air cooling or ventilating equipment not designed to remove air contaminants generated by or released from associated equipment
- Refrigeration systems with less than 50 pounds of charge of ozone depleting substances regulated under Title VI, including pressure tanks used in refrigeration systems but excluding any combustion equipment associated with such systems
- Bench scale laboratory equipment and laboratory equipment used exclusively for chemical and physical analysis, including associated vacuum producing devices but excluding research and development facilities
- Temporary construction activities
- Warehouse activities
- Accidental fires
- Air vents from air compressors
- Air purification systems
- Continuous emissions monitoring vent lines
- Demineralized water tanks
- Electrical charging stations
- Fire brigade training
- Instrument air dryers and distribution
- Process raw water filtration systems
- Fire suppression
- Blueprint making
- Routine maintenance, repair and replacement such as anticipated activities most often associated with and performed during regularly scheduled equipment outages to maintain a plant and its equipment in good operating condition, including but not limited to steam cleaning, abrasive use and woodworking
- Electric motors
- Storage tanks, reservoirs, transfer and lubricating equipment used for ASTM grade distillate or residual fuels, lubricants and hydraulic fluids

- On-site storage tanks not subject to any New Source Performance Standards (NSPS), including underground storage tanks (UST), storing gasoline or diesel used exclusively for fueling of the facility's fleet of vehicles
- Natural gas, propane and liquefied petroleum gas (LPG) storage tanks and transfer equipment
- Pressurized tanks containing gaseous compounds
- Vacuum sheet stacker vents
- Storm water settling basins
- Fire suppression and training
- Hazardous air pollutant emissions of fugitive dust from paved and unpaved roads except for those sources that have processes or activities that contribute to the deposition and entrainment of hazardous air pollutants from surface soils
- Health, safety and emergency response activities
- Emergency generators and pumps used only during loss of primary equipment or utility service due to circumstances beyond the reasonable control of the owner or operator, or to address a power emergency as determined by DEQ
- Non-contact steam vents and leaks and safety and relief valves for boiler steam distribution systems
- Non-contact steam condensate flash tanks
- Non-contact steam vents on condensate receivers, deaerators and similar equipment
- Boiler blowdown tanks
- Oil/water separators in effluent treatment systems
- Combustion source flame safety purging on startup
- Stock cleaning and pressurized pulp washing, excluding open stock washing systems

EMISSION LIMITS AND STANDARDS, TESTING, MONITORING AND RECORDKEEPING

13. Fugitive Emissions – OAR 340-208-0210 is a requirement to take reasonable precautions to minimize fugitive particulate emissions.

    13.a. Testing Requirements: By definition it is not possible to perform source emission tests on fugitive emission sources. Therefore, the permit does not include any testing requirements or compliance test methods.

    13.b. Monitoring Requirements: To satisfy the Title V periodic monitoring requirements, the permittee is required to perform a visible emissions survey at specified frequencies that can be gradually reduced based upon previous monitoring results to determine if any visible emissions are leaving the plant site boundaries. If there are visible emissions the permittee must take corrective action to minimize the fugitive emissions. The permittee must maintain records of the surveys and corrective actions, if necessary.

14. Nuisance – OAR 340-208-0300 is a requirement that prohibits nuisance conditions from a source, and OAR 340-208-0450 is a requirement that prohibits particulate fallout from a source. These requirements are not part of the State Implementation Plan (SIP) so they are enforceable only by the State. Nuisance conditions must be verified by DEQ. In order to determine whether a nuisance condition may exist, the permittee is required to keep a log of any complaints and report them to DEQ. The permittee is also required to respond to the complainant within a reasonable amount of time and conduct an investigation as to whether any operations under their control may have caused a nuisance condition.

15. Since the facility was constructed after 1970, the facility is subject to a 20% opacity limit as a 6-minute block average for all non-fugitive sources. [OAR 340-208-0110(4)]

    15.a. Testing Requirement: EPA Method 9 is used to measure opacity, when required.

15.b. Monitoring Requirement: Proper maintenance and operation of the engines and flares should ensure the opacity is within the limits. The permit will require quarterly opacity monitoring and maintenance in accordance with the manufacturer's recommendation to ensure proper operation.

16. The grain loading standards of OAR 340-226-0210 apply only to the non-fugitive sources at the facility. This includes the flares and engines. The grain loading standards for fuel burning equipment (OAR 340-228-0210) apply to the boiler and the grain loading standards for process equipment (OAR 340-226-0210(2)(c)) and apply to the dryer.

16.a. The engines (ENG1, ENG2 & ENG3) were installed between June 1, 1970 and April 16, 2015 and all compliance source test results on these units have demonstrated particulate emissions less than 0.080 gr/dscf. Therefore, the grain loading limit for these units is 0.10 gr/dscf. [OAR 340-226-0210(2)(b)(A)]
16.b. The open flares (FL-1 and FL-2) have not been tested for particulate emissions. Therefore, the grain loading limit for these units is 0.10 gr/dscf. [OAR 340-226-0210(2)(c)]
16.c. The boiler is a fuel burning equipment unit that will be installed after April 1, 2015. Therefore, the grain-loading limit for this unit is 0.10 gr/dscf. [OAR 340-228-0210(2)(c)]
16.d. The fiber dryer emissions are combined with engine exhaust (ENG1, ENG2 & ENG3) supplemented by the boiler heater emissions prior to passing through a cyclone separator, baghouse and a water mist scrubber before being routed to the stack. The grain-loading limit for this unit is 0.10 gr/dscf. [OAR 340-226-0210(2)(c)]
16.e. Testing Requirement: All of the engines have been tested to demonstrate compliance with the grain loading limit while burning biogas. Particulate testing will be required during this permit term.
16.f. Monitoring Requirement: Proper maintenance and operation of the flares, boiler, dryer, and engines should ensure compliance with the limit.

17. 40 CFR Part 68 – Accidental Release Prevention Regulations do not apply to the facility at this time as there are no substances stored or used at the facility in threshold quantities. However, this regulation may be applicable in the future if the threshold quantities are exceeded.

Federal Requirements:

18. The NSPS General Provisions (40 CFR 60, Subpart A) and NSPS for Stationary Spark Ignition Internal Combustion Engines (40 CFR 60, Subpart JJJJ) are applicable to the engines at this facility. Provided below is a list of the NSPS general requirements that may need to be included in the permit as applicable requirements:

Summary of NSPS Subpart A

General Provision Requirements:

Part 60 Citation	Requirement	Permit Action
60.7	Notification and Recordkeeping	Applicable requirements are contained in the permit.
60.8	Performance Tests	40 CFR 60.4246 indicates that 40 CFR 60.8 only applies to engines subject to performance testing in Subpart JJJJ. This condition is included in the permit.
60.11	Compliance with Standards and Maintenance Requirements	40 CFR 60.4246 & Table 3 indicates that 40 CFR 60.11 is applicable to this source.
60.12	Circumvention	Applicable requirements are contained in the permit.
60.13	Continuous Monitoring System	Not applicable for this source.
60.18	General Control Device Requirements	Not applicable for this source.

Summary of NSPS Subpart JJJJ

Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

Part 60 Citation	Requirement	Comment
60.4230	Applicability	The engines were manufactured after 7/1/07 and have a maximum engine power greater than 500 HP. The engines are subject to Subpart JJJJ.
60.4231 and 60.4232	Emission Standards for Manufacturers	Not applicable. Facility does not manufacture engines.
60.4233 Table 1	Emission Standards for Owners and Operators	Standards for pipeline quality natural gas engines, >500 HP, manufactured after 7/1/10 are: 1.0 g NO_x/HP-hr (82 ppmvd @ 15% O2) 2.0 g CO/HP-hr (270 ppmvd @ 15% O2); 0.7 g VOC/HP-hr (60 ppmvd @ 15% O2).
60.4234	Duration of Compliance with Standards	Must comply over entire life of engine.
60.4235	Fuel Requirements for Gasoline-Fired Engines	Not applicable. Engines are fired only on pipeline quality natural gas.
60.4236	Deadline for Installing Engines Manufactured Prior to 7/1/07	Engines are required to meet applicable requirements of 60.4233, Table 1.
60.4237	Monitoring Requirements for Emergency Engines	Not applicable. Engines are not emergency engines.
60.4238 through 60.4242	Compliance Requirements for Manufacturers	Not applicable. Facility is not an engine manufacturer.
60.4243	Compliance Requirement for Owners and Operators	Either purchase a certified engine and maintain according to manufacturer's instructions or conduct initial testing of non-certified engine to demonstrate compliance and subsequent tests every 8,760 hours of engine operation or 3 years, whichever comes first.
60.4244	Test Methods for Demonstrating Compliance	Standard EPA test methods required.
60.4245	Notification, Recordkeeping and Reporting Requirements	Maintain records of notifications, certifications, testing and maintenance.
60.4246	General Provisions	General provisions listed in Table 3 are applicable.
60.4247	Mobile Source Provisions	Not applicable. Source is not mobile.
60.4248	Definitions	These are applicable, but do not establish any specific requirements.

19. The NSPS Subpart JJJJ is applicable to all three engines (ENG1, ENG2 & ENG3). [40 CFR 60.4230]

    19.a. Testing Requirement: All engine units (ENG1, ENG2 & ENG3) will be tested to demonstrate compliance with the NSPS 40 CFR 60.4233, Table 1 emission standards. Source testing will be required during this permit term.

    19.b. Monitoring Requirement: Proper maintenance and operation of the engines are required to ensure compliance with 40 CFR 60.4245.

20. The NSPS General Provisions (40 CFR 60, Subpart A) and NSPS for Small Industrial-Commercial Institutional Steam generating Units (40 CFR 60, Subpart Dc) are applicable to the gas treatment system boiler at this facility. The fiber dryer natural gas heater meets the definition of a process heater and is therefore not an affected source and is not subject to this subpart. Provided below is a list of the NSPS general requirements that are included in the permit as applicable requirements:

Summary of NSPS Subpart A

General Provision Requirements:

Part 60 Citation	Requirement	Permit Action
60.7	Notification and Recordkeeping	Applicable requirements are contained in the permit.

Summary of NSPS Subpart Dc

Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units:

Part 60 Citation	Requirement	Comment
60.40c	Applicability	The boiler was manufactured after 6/9/1989 and has a maximum design heat input capacity greater or equal to 10 MMBtu/hr. The gas treatment system boiler is subject to Subpart Dc.
60.41c	Definitions	These are applicable but do not establish any specific requirements.
60.42c	Standard for sulfur dioxide (SO2)	No applicable standards for units that combust natural gas.
60.43c	Standard for particulate matter (PM)	No applicable standards for units that combust natural gas.
60.44c	Compliance and performance test methods and procedures for sulfur dioxide	No applicable standards for units that combust natural gas.
60.45c	Compliance and performance test methods and procedures for particulate matter	No applicable standards for units that combust natural gas.
60.46c	Emission monitoring for sulfur dioxide	No applicable standards for units that combust natural gas.
60.47c	Emission monitoring for particulate matter	No applicable standards for units that combust natural gas.
60.48c	Reporting and recordkeeping requirements	Submit an initial notification the date the actual startup of the gas treatment system boiler and record and maintain records of the amount of fuel combusted during each calendar month.

21. The boiler is not subject to area source boiler MACT, Subpart JJJJJJ because it is a gas-fired boiler in accordance with 40 CFR 63.11195(e).

22. The National Emission Standards for Hazardous Air Pollutants (NESHAP) for Stationary Reciprocating Internal Combustion Engines (Subpart ZZZZ) is applicable to the engines, even though the facility is not a major source of Hazardous Air Pollutants (HAP). 40 CFR 63.6665 specifies that stationary engines located at an area source of HAPs do not need to comply with any of the requirements of the general provisions. The engines are considered new sources since construction commenced after 6/12/2006. 40 CFR 63.6590(c) specifies that a new source located at an area source of HAP emissions must meet the requirements of 40 CFR Part 63, Subpart ZZZZ by meeting the requirements of 40 CFR Part 60, Subpart JJJJ. No further requirements apply for such engines under the NESHAP.

23. The RACT rules are not applicable to this source because it is not in the Portland AQMA, Medford AQMA or Salem SKATS.

24. The Department has determined that the engines are not subject to the Typically Available Control Technology (TACT) requirements in Division 226 because the engines are subject to the New Source Performance Standards for internal combustion engines (40 CFR Part 60, Subpart JJJJ).

25. As identified earlier in this Review Report, this facility has insignificant emissions units (IEUs) that include categorically insignificant activities and aggregate insignificant emissions, as defined in OAR 340-200-0020. For the most part, the standards that apply to IEUs are for opacity (20% limit) and particulate matter (0.1 gr/dscf limit). DEQ does not consider it likely that IEUs could exceed an applicable emissions limit or standard because IEUs are generally equipment or activities that do not have any emission controls (e.g., small natural gas fired space heaters) and do not typically have visible emissions. Since there are no controls, no visible emissions, and the emissions are less than one ton per year, DEQ does not believe monitoring, recordkeeping or reporting is necessary for assuring compliance with the standards.

PLANT SITE EMISSION LIMITS

26. Provided below is a summary of the baseline emission rates, netting basis and plant site emission limits.

Pollutant	Baseline Emission Rate (tons/yr)	Netting Basis		Plant Site Emission Limit (PSEL)		
		Previous (tons/yr)	Proposed (tons/yr)	Previous PSEL (tons/yr)	Proposed PSEL (tons/yr)	PSEL Increase (tons/yr)
PM	0	0	0	24	24	0
PM_{10}	0	0	0	16	14	-2
$PM_{2.5}$	0	0	0	15	9	-6
CO	0	0	0	151	151	0
NO_x	0	0	0	39	39	0
SO_2	0	0	0	39	39	0
VOC	0	0	0	39	39	0
GHG (CO_2e)	0	0	0	74,000	74,000	0

26.a. The baseline emission rate and the netting basis are zero because this facility was constructed after the baseline period of 1977-1978 for all pollutants other than GHG, and 2001-2010 for GHG. In addition, the source is not subject to New Source Review (NSR) for Prevention of Significant Deterioration (PSD) under OAR 340-224-0070.

26.b. The proposed PSEL for all pollutants except for CO are equal to the Generic PSEL in accordance with OAR 340-222-0040(1).

26.c. The PSEL for CO is equal to the potential to emit (PTE) in accordance with OAR 340-222-0041(2). The Emissions Detail Sheets provide the potential emission calculations in Attachment 1.

26.d. The CO_2, CH_4 and N_2O emissions from combusting natural gas and treating the biogas is emitted above diminimis levels (< 2,750 tons/year). A PSEL for GHGs has been established in this permit action. The basis for this may be found in the Emissions Detail Sheets in Attachment 1.

26.e. The PSEL is a federally enforceable limit on the potential to emit.

SIGNIFICANT EMISSION RATE

27. There are no proposed increases in emissions. The CO emissions are more than the SER over the netting basis and subject to the State New Source Review Type B. Modeling was performed in a previous permit and is still valid showing no violations of the NAAQS. No further analysis required.

HAZARDOUS AIR POLLUTANTS

28. A major source is a facility that has the potential to emit 10 tons/yr or more of any single HAP or 25 tons/yr or more of combined HAPs. This source is not a major source of hazardous air pollutants. According to the application, the maximum estimated potential to emit of combined HAPs is 7.4 tons per year. WOF PNW will need to update thir Cleaner Air Oregon toxic emission inventory which they previously submitted to DEQ.

GENERAL BACKGROUND INFORMATION

29. This source is located in an area that is in attainment for all pollutants. This source is not located within 100 kilometers (62 miles) of any Class I air quality protection areas.

COMPLIANCE HISTORY

30. The facility has been inspected on two separate occasions by DEQ personnel to ensure compliance with the permit conditions.

Inspection Date	Results of Inspection	Department Actions
11/19/2015	In Compliance	No Action Necessary
5/24/2018		

31. During the current permit period there have been no complaints recorded for this facility.

32. No enforcement action has been taken against this source since the permit has been issued.

SOURCE TEST RESULTS

Source Test Data Results:

Source Test Date	ENG1				
	$PM/PM_{10}/PM_{2.5}$	NO_x	SO_2	CO	VOC
	lbs/hr				
May 2013		2.85	0.39	10.10	
		2.69	0.23	9.67	
		2.79	0.15	9.81	
Nov 2013	0.98				0.28
	0.85				0.30
	1.37				0.19
May 2014		1.91		9.98	
		1.85		9.54	
		1.86		9.59	
		1.88		9.67	
Dec 2015		4.28		12.19	0.46
		4.7		11.99	0.44
		4.87		12.35	0.43
Oct 2016		3.23		9.47	0.34
		3.33		9.39	0.42
		3.29		9.41	0.38
Oct 2017	0.63	2.27		10.41	1.23
	0.66	2.28		10.38	1.05
	0.61	2.22		10.24	1.00
AVERAGE	**0.85**	**2.89**	**0.26**	**10.26**	**0.54**

Source Test Date	ENG2				
	$PM/PM_{10}/PM_{2.5}$	NO_x	SO_2	CO	VOC
	lbs/hr				
May 2013		4.01	0.08	15.63	
		4.28	0.08	15.26	
		3.53	0.08	14.88	
Nov 2013	1.63				0.22
	1.27				0.26
	1.53				0.23
May 2014		2.08		9.91	
		2.52		11.87	
		2.04		9.66	
Dec 2015		4.70		13.21	0.46
		4.70		13.66	0.44
		4.80		13.21	0.46
Oct 2016		1.26		7.52	0.37
		1.44		8.41	0.41
		1.42		8.30	0.42
Oct 2017	0.65	1.55		9.90	1.14
	0.80	1.55		9.98	1.28
	0.90	1.56		10.20	1.02
AVERAGE	**1.13**	**2.76**	**0.08**	**11.44**	**0.56**

Source Test Date	ENG3				
	$PM/PM_{10}/PM_{2.5}$	NO_x	SO_2	CO	VOC
	lbs/hr				
May 2013		0.79	0.07	13.92	
		0.98	0.09	13.21	
		0.88	0.08	14.11	
Nov 2013	0.30				0.37
	0.47				0.31
	0.46				
May 2014		1.20		12.01	
		1.16		11.88	
		1.15		11.83	
Dec 2015		0.45		10.82	0.72
		0.49		10.72	0.64
		0.44		11.46	0.62
Oct 2016		0.39		9.87	0.72
		0.12		9.76	0.71
		0.27		9.72	0.66
Oct 2017	0.70	1.00		8.91	0.37
	0.23	0.93		8.89	0.40
	0.29	0.89		8.68	0.44
AVERAGE	**0.41**	**0.74**	**0.08**	**11.05**	**0.54**

Summary of the average emission factors for each engine while using biogas:

Biogas Engine Units	$PM/PM_{10}/PM_{2.5}$	NO_x	SO_2	CO	VOC
	lbs/hr				
ENG1	0.85	2.89	0.26	10.26	0.54
ENG2	1.13	2.76	0.08	11.44	0.56
ENG3	0.41	0.74	0.08	11.05	0.54

To be conservative the emission factors from burning biogas listed here will be used for burning natural gas, until better source test data becomes available.

PUBLIC NOTICE

33. This permit will be placed on public notice from **Mar. 21, 2019** to **April 25, 2019**. Comments may be submitted in writing during the comment period. DEQ will hold a public hearing if requested by 10 or more individuals or one person representing a group of 10 or more individuals. After the comment period and hearing, if requested, DEQ will review the comments and modify the permit as may be appropriate. A proposed permit will be sent to EPA for a 45 day review period. DEQ may request and EPA may agree to an expedited review of 5 days if there were no substantive or adverse comments during the comment period.

    If EPA does not object in writing, any person may petition the EPA within 60 days after the expiration of EPA's 45-day review period to make such objection. Any such petition must be based only on objections to the permit that were raised with reasonable specificity during the public comment period provided for in OAR 340-218-0210, unless the petitioner demonstrates it was impracticable to raise such objections within such period, or unless the grounds for such objection arose after such period.

ATTACHMENT 1: EMISSIONS DETAIL SHEETS

PM Emissions while Burning Biogas Fuels in the Engines:

Emission Point	Emission Factor		Operating Parameters Rate		Emission Factor Reference	Emissions (ton/yr)
ENG1	0.85	lb/hr	8760	hr/yr	Source Test	3.7
ENG2	1.13					4.9
ENG3	0.41					1.8
SRT & PFD1	9.0	lbs/MMscf	157.68	MMscf/yr	AP-42 Table 2.4-4	0.7
MH	0.04	lb/hr	8760	hr/yr	AQ-EF02/03	0.2
UPR	1.16				AP-42, 13.2.2	5.1
Total PM Emissions (tons/yr):						**16.43**

PM Emissions when Engines Burn Natural Gas and the Gas Treatment System is Installed and Operational:

Emission Point	Emission Factor		Operating Parameters Rate		Emission Factor Reference	Emissions (ton/yr)
ENG1	*	*	*	*	*	*
ENG2						
ENG3						
DRYER	247.31	lbs/MMscf	52.42	MMscf/yr	Manufacturer	6.48
BOILER	7.5		116.8		Manufacturer	0.44
ENG1-AOS	0.85	lb/hr	262.8	hr/yr	Source Test	0.11
ENG2-AOS	1.13					0.15
ENG3-AOS	0.41					0.05
FL-1 & FL-2	9.0	lbs/MMscf	49.43	MMscf/yr	AP42 2.4-4	0.22
BEDDING	0.02	lb/BDT	30,218	BDT/yr	AQ-EF02/03	0.30
UPR	0.83	lbs/hr	8760	hrs/yr	AP-42, 13.2.2	3.62
Total PM Emissions (tons/yr)[1/]:						**10.84**

*PM emissions for engines ENG1, ENG2 and ENG3 are combined in the DRYER emission factors when burning natural gas.

PM_{10} Emissions while Burning Biogas Fuels in the Engines:

Emission Point	Emission Factor		Operating Parameters Rate		Emission Factor Reference	Emissions (ton/yr)
ENG1	0.85	lb/hr	8760	hr/yr	Source Test	3.7
ENG2	1.13					4.9
ENG3	0.41					1.8
SRT & PFD1	9.0	lbs/MMscf	157.68	MMscf/yr	AP-42 Table 2.4-4	0.7
MH	0.04	lb/hr	8760	hr/yr	AQ-EF02/03	0.2
UPR	0.31				AP-42, 13.2.2	1.4
Total PM_{10} Emissions (tons/yr):						**12.70**

PM_{10} Emissions when Engines Burn Natural Gas and the Gas Treatment System is Installed and Operational:

Emission Point	Emission Factor		Operating Parameters Rate		Emission Factor Reference	Emissions (ton/yr)
ENG1	*	*	*	*	*	*
ENG2						
ENG3						
DRYER	247.31	lbs/MMscf	52.42	MMscf/yr	Manufacturer	6.48
BOILER	7.5		116.8		Manufacturer	0.44
ENG1-AOS	0.85	lb/hr	262.8	hr/yr	Source Test	0.11
ENG2-AOS	1.13					0.15
ENG3-AOS	0.41					0.05
FL-1 & FL-2	9.00	lbs/MMscf	49.43	MMscf/yr	AP42 2.4-4	0.22
BEDDING	0.02	lb/BDT	30,218	BDT/yr	AQ-EF02/03	0.30
UPR	0.22	lbs/hr	8760	hrs/yr	AP-42, 13.2.2	0.98
Total PM_{10} Emissions (tons/yr)[1/]:						**8.20**

*PM_{10} emissions for engines ENG1, ENG2 and ENG3 are combined in the DRYER emission factors when burning natural gas.

$PM_{2.5}$ Rmissions while Burning Biogas Fuels in the Engines:

Emission Point	Emission Factor		Operating Parameters Rate		Emission Factor Reference	Emissions (ton/yr)
ENG1	0.85	lb/hr	8760	hr/yr	Source Test	3.7
ENG2	1.13					4.9
ENG3	0.41					1.8
SRT & PFD1	9.0	lbs/MMscf	157.68	MMscf/yr	AP-42 Table 2.4-4	0.7
MH	0.02	lb/hr	8760	hr/yr	AQ-EF02/03	0.1
UPR	0.03				AP-42, 13.2.2	0.1
Total $PM_{2.5}$ Emissions (tons/yr):						**11.39**

$PM_{2.5}$ Emissions when Engines Burn Natural Gas and the Gas Treatment System is Installed and Operational:

Emission Point	Emission Factor		Operating Parameters Rate		Emission Factor Reference	Emissions (ton/yr)
ENG1	*	*	*	*	*	*
ENG2						
ENG3						
DRYER	247.31	lbs/MMscf	52.42	MMscf/yr	Manufacturer	6.48
BOILER	7.5		116.8		Manufacturer	0.44
ENG1-AOS	0.85	lb/hr	262.8	hr/yr	Source Test	0.11
ENG2-AOS	1.13					0.15
ENG3-AOS	0.41					0.05
FL-1 & FL-2	9.0	lbs/MMscf	49.43	MMscf/yr	AP42 2.4-4	0.22
BEDDING	0.01	lb/BDT	30,218	BDT/yr	AQ-EF02/03	0.15
UPR	0.02	lbs/hr	8760	hrs/yr	AP-42, 13.2.2	0.10
Total $PM_{2.5}$ Emissions (tons/yr)[1/]:						**7.17**

*$PM_{2.5}$ emissions for engines ENG1, ENG2 and ENG3 are combined in the DRYER emission factors when burning natural gas.

SO_2 Emissions while Burning Biogas Fuels in the Engines:

Emission Point	Emission Factor		Operating Parameters Rate		Emission Factor Reference	Emissions (ton/yr)
ENG1	0.26	lb/hr	8760	hr/yr	Ave. Source Test May 2013	1.12
ENG2	0.08					0.35
ENG3	0.08					0.35
SRT & PFD1	97.8	lbs/MMscf	157.68	MMscf/yr	98% of H_2S (600 ppm) burned to SO_2	7.71
Total SO_2 Emissions (tons/yr):						**9.53**

SO_2 Emissions when Engines Burn Natural Gas and the Gas Treatment System is Installed and Operational:

Emission Point	Emission Factor		Operating Parameters Rate		Emission Factor Reference	Emissions (ton/yr)
ENG1	0.26	lb/hr	8497.2	hr/yr	Source Test	1.09
ENG2	0.08					0.34
ENG3	0.08					0.34
DRYER	0.6	lbs/MMscf	52.42	MMscf/yr	AP42 1.4-2	0.02
BOILER	0.6		116.8		Manufacturer	0.04
ENG1-AOS	0.26	lb/hr	262.8	hr/yr	Source Test	0.03
ENG2-AOS	0.08					0.01
ENG3-AOS	0.08					0.01
FL-1 & FL-2	97.8	lbs/MMscf	49.43	MMscf/yr	AP42 2.4-4	2.42
Total SO_2 Emissions (tons/yr)[1/]:						**1.82**

NO_x Emissions while Burning Biogas Fuels in the Engines:

Emission Point	Emission Factor		Operating Parameters Rate		Emission Factor Reference	Emissions (ton/yr)
ENG1	2.89	lb/hr	8760	hr/yr	Source Test	12.67
ENG2	2.76					12.10
ENG3	0.74					3.25
SRT & PFD1	23.4	lbs/MMscf	157.68	MMscf/yr	AP-42 Table 2.4-4	1.84
Total NO_x Emissions (tons/yr):						**29.87**

NO_x Emissions when Engines Burn Natural Gas and the Gas Treatment System is Installed and Operational:

Emission Point	Emission Factor		Operating Parameters Rate		Emission Factor Reference	Emissions (ton/yr)
ENG1	2.89	lb/hr	8497.2	hr/yr	Source Test	12.29
ENG2	2.76					11.74
ENG3	0.74					3.16
DRYER	100	lbs/MMscf	52.42	MMscf/yr	AP42 1.4-1	2.62
BOILER	70		116.8		Manufacturer	4.09
ENG1-AOS	2.89	lb/hr	262.8	hr/yr	Source Test	0.38
ENG2-AOS	2.76					0.36
ENG3-AOS	0.74					0.10
FL-1 & FL-2	23.4	lbs/MMscf	49.43	MMscf/yr	AP42 2.4-4	0.58
Total NO_x Emissions (tons/yr)[1/]:						**33.90**

CO Emissions while Burning Biogas Fuels in the Engines:

Emission Point	Emission Factor		Operating Parameters Rate		Emission Factor Reference	Emissions (ton/yr)
ENG1	10.26	lb/hr	8760	hr/yr	Source Test	44.95
ENG2	11.44					50.11
ENG3	11.05					48.41
SRT & PFD1	27.6	lbs/MMscf	157.68	MMscf/yr	AP-42 Table 2.4-4	2.18
Total CO Emissions (tons/yr):						**154.64**

CO Emissions when Engines Burn Natural Gas and the Gas Treatment System is Installed and Operational:

Emission Point	Emission Factor		Operating Parameters Rate		Emission Factor Reference	Emissions (ton/yr)
ENG1	10.26	lb/hr	8497.2	hr/yr	Source Test	43.60
ENG2	11.44					48.60
ENG3	11.05					46.96
DRYER	84	lbs/MMscf	52.42	MMscf/yr	AP42 1.4-1	2.20
BOILER	37.5		116.8		Manufacturer	2.19
ENG1-AOS	10.26	lb/hr	262.8	hr/yr	Source Test	1.35
ENG2-AOS	11.44					1.50
ENG3-AOS	11.05					1.45
FL-1 & FL-2	27.6	lbs/MMscf	49.43	MMscf/yr	AP42 2.4-4	0.68
Total CO Emissions (tons/yr)[1/]:						**143.55**

VOC Emissions while Burning Biogas Fuels in the Engines:

Emission Point	Emission Factor		Operating Parameters Rate		Emission Factor Reference	Emissions (ton/yr)
ENG1	0.54	lb/hr	8760	hr/yr	Source Test	2.38
ENG2	0.56					2.45
ENG3	0.54					2.37
SRT & PFD1	84	lbs/MMscf	157.68	MMscf/yr	RLBC ID: IA-0095	6.62
Total VOC Emissions (tons/yr):						**13.82**

VOC Emissions when Engines Burn Natural Gas and the Gas Treatment System is Installed and Operational:

Emission Point	Emission Factor		Operating Parameters Rate		Emission Factor Reference	Emissions (ton/yr)
ENG1	0.54	lb/hr	8497.2	hr/yr	Source Test	2.31
ENG2	0.56					2.38
ENG3	0.54					2.30
DRYER	169.1	lbs/MMscf	52.42	MMscf/yr	AP42 1.4-2	4.43
BOILER	3.6		116.8		Manufacturer	0.21
ENG1-AOS	0.54	lb/hr	262.8	hr/yr	Source Test	0.07
ENG2-AOS	0.56					0.07
ENG3-AOS	0.54					0.07
FL-1 & FL-2	84	lbs/MMscf	49.43	MMscf/yr	AP42 2.4-4	2.08
Total VOC Emissions (tons/yr)[1/]:						**11.63**

[1/] Total potential emissions are conservatively based on the highest emitting operating scenario, which is normal operations. Therefore, the highest annual emission totals listed below do not include emissions from when the engines operate under alternate operating scenario (AOS), the DRYER is off line, and the flare (FL-1 & FL-2) operations.

GHG CO_{2eq} Emissions while Burning Biogas Fuels in the Engines:

Emission Unit	Annual Biogas Throughput	GHG Pollutant	Emission Factor & GWP	EF Units	Reference	CO_2 Emissions (metric tons/yr)	CO_2 Emissions (short tons/yr)
Combined Engines and Flare (Biogas)	1,500 scfm to engines & 300 scfm to flares SRT & PFD1	GHG-CH_4	2.97E-09 (GWP=25)	Short tons/scf	DEQ (GHG Calculator)	64	70
		GHG-CO_2	4.83E-05 (GWP=1)			41430	45668
		GHG-N_2O	5.84E-10 (GWP=298)			149	165
Total AI GHG						2,500	2,756
Total GHG Potential Emissions CO_{2eq} Emissions:						**44,143**	**48,659**

The GHG emissions are based on 8,760 hours of operation with 1,500 scfm (788.4 MMscf/yr) of biogas burned in the combined engines and 300 scfm (157.68 MMscf/yr) burned at the combined flares SRT and PFD1. The potential GHG emissions calculation is extremely conservative considering the anaerobic digester is designed to produce a maximum of 1,700 scfm (893.52 MMscf/yr) of biogas.

GHG CO_{2eq} Emissions when Gas Treatment System is Installed and Operational:

Emission Point	Emission Factor		Operating Parameters Rate		Emission Factor Reference	Emissions (ton/yr)
ENG1	60.07	tons/MMscf	140.2038	MMscf/yr	GHG EZ Filer	8,413
ENG2	60.07					8,413
ENG3	60.07					8,413
ENG-AOS	60.07		4.34			--
FL-1 & FL-2	37.79		4.34			--
DRYER	60.07		52.422588			3,146
BOILER	60.07		116.8			7,008
TAILGAS	23.4		1647.8		Conservative Estimate	38,548
Total VOC Emissions (tons/yr):						**73,980**

The total Potential GHG CO_{2eq} emissions are based on the TAILGAS and engines (ENG1, ENG2 & ENG3 operating 8,760 per year. The alternate operating scenario for the engines and flares are not included to avoid double counting.

Potential To Emit (tons per year) while Burning Biogas Fuels in the Engines:

Emission Units	PM	PM_{10}	$PM_{2.5}$	NO_x	CO	SO_2	VOC	GHG
	(tons per year)							
ENG1	3.7	3.7	3.7	12.7	45.0	1.1	2.38	*
ENG2	4.9	4.9	4.9	12.1	50.1	0.4	2.45	*
ENG3	0.4	0.4	0.4	3.3	48.4	0.4	2.37	*
SRT & PFD1	0.7	0.7	0.7	1.8	2.2	7.7	6.6	*
UPR	5.1	1.4	0.1	---	---	---	---	*
AI	1	1	1	1	1	1	1	*
PTE (tons/yr)	**15.8**	**12.1**	**10.8**	**30.9**	**146.7**	**10.6**	**14.8**	**48,659**

* See GHG emission calculations for burning biogas fuels above.

Potential To Emit (tons per year) when Gas Treatment System is Installed and Operational:

Emission Units	PM	PM_{10}	$PM_{2.5}$	NO_x	CO	SO_2	VOC	GHG
	(tons per year)							
ENG1				12.29	43.60	1.09	2.31	8,423
ENG2				11.74	48.60	0.34	2.38	8,423
ENG3				3.16	46.96	0.34	2.30	8,423
DRYER	6.48	6.48	6.48	2.62	2.20	0.02	4.43	3,149
BOILER	0.44	0.44	0.44	4.09	2.19	0.04	0.21	7,016
ENG1-AOS	0.11	0.11	0.11	0.38	1.35	0.03	0.07	260
ENG2-AOS	0.15	0.15	0.15	0.36	1.50	0.01	0.07	260
ENG3-AOS	0.05	0.05	0.05	0.10	1.45	0.01	0.07	260
FL-1 & FL-2	0.22	0.22	0.22	0.58	0.68	2.42	2.08	1,868
TAILGAS								38,548
BEDDING	0.30	0.30	0.15					
UPR	3.62	0.98	0.10					
PTE (tons/yr)	10.84	8.20	7.17	33.90	143.55	1.82	11.63	73,980

PSEL (tons per year):

PM	PM_{10}	$PM_{2.5}$	NO_x	CO	SO_2	VOC	GHG
24	14	9	39	151	39	39	74,000

Potential Hazardous Air Pollutant Emissions Summary:

Emission Point	Emissions (tons/yr)
ENG1	2.28
ENG2	2.28
ENG3	2.28
ENG1-AOS	0.21
ENG2-AOS	
ENG3-AOS	
DRYER	0.05
BOILER	0.11
FL-1 & FL-2	6.89E-03
Total HAPs:	**7.4**

Operating Parameters

Parameter	Digester Biogas	Product Gas	Tail Gas
Composition (volume %)			
CH_4	60	99.0	0.1
CO_2	40	0.5	99.9
H_2S (ppm)	600	0	30
Flow Rate (scfm)	3135	1881	1254
Ratio	100%	60%	40%
HHV (Btu/ft^3)	660	970	100

Dryer Operating Load (% Btu/hr input)	80%
Boiler Operating Load (% Btu/hr input)	85%
ENG-1, ENG-2, ENG-3 Op Load	97%

Generator Engines 1-3 (ENG1, ENG2 and ENG3)

Engine Data	
Name	Generator Engines 1-3 (each)
Manufacturer	Caterpillar
Model Number	G3520C
Max Rating (HP)	2242
Annual Load Limit	97%
Operating Horsepower:	2,242
Operating Fuel Consumption (scf/hr):	16,500
Operating Rating (MMBtu/hr):	16.83
Hours of Operation per Year:	8,760
Engine Type:	4 Stroke, Rich-Burn

Generator Engines 1-3 (ENG1-AOS, ENG2-AOS and ENG3-AOS)

Engine Data	
Name	Generator Engines 1-3 (each)
Manufacturer	Caterpillar
Model Number	G3520C
Max Rating (HP)	2242
Annual Load Limit	3%
Operating Horsepower:	2,242
Operating Fuel Consumption (scf/hr):	16,500
Operating Rating (MMBtu/hr):	16.83
Hours of Operation per Year:	262.8
Engine Type:	4 Stroke, Rich-Burn

Fuel Data	
Fuel Type	Natural Gas
Heat Value (HHV)	1,020

Engines:

Emissions Factors (lb/hr)[a]							
	PM	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**NO_x**	**CO**	**VOC**
ENG1				0.26	2.89	10.26	0.54
ENG2				0.08	2.76	11.44	0.56
ENG3				0.08	0.74	11.05	0.54

[a] – Engine emission factors are based on average of source tests. The permittee believes these to be conservative values. The $PM/PM_{10}/PM_{2.5}$ emissions for engines ENG1, ENG2 and ENG3 are combined in the fiber dryer emission factors, which are based on vendor guarantees. All other criteria pollutants emissions for engines ENG1, ENG2 and ENG3 going through the dryer are provided separately.

Annual Emissions (TPY)							
	PM	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**NO_x**	**CO**	**VOC**
ENG1				1.09	12.29	43.60	2.31
ENG2				0.34	11.74	48.60	2.38
ENG3				0.34	3.16	46.96	2.30
Total Emissions:				1.77	27.19	139.16	6.99

The ENG1, ENG2 and ENG3 engine exhaust will be directed to the fiber dyer for ninety-seven percent (97%) of the annual operations or 8,497.2 hr/yr.

Emissions Factors (lb/hr)[a]							
	PM	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**NO_x**	**CO**	**VOC**
ENG1-AOS	0.85	0.85	0.85	0.26	2.89	10.26	0.54
ENG2-AOS	1.13	1.13	1.13	0.08	2.76	11.44	0.56
ENG3-AOS	0.41	0.41	0.41	0.08	0.74	11.05	0.54

[a] - Existing Permit ENG-AOS emission factors, based on average of source tests. These are conservative values given that the conversion from combusting biogas to natural gas will result in equal or lower emissions.

Annual Emissions (TPY)							
	PM	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**NO_x**	**CO**	**VOC**
ENG1-AOS	0.11	0.11	0.11	0.03	0.38	1.35	0.07
ENG2-AOS	0.15	0.15	0.15	0.01	0.36	1.50	0.07
ENG3-AOS	0.05	0.05	0.05	0.01	0.10	1.45	0.07
Total Emissions:	**0.31**	**0.31**	**0.31**	**0.05**	**0.84**	**4.30**	**0.22**

All criteria pollutants emissions for ENG1-AOS, ENG2-AOS and ENG3-AOS are going to be routed directly to the atmosphere via a single dump stack located in front of the fiber dyer.

HAP Emission Calculations			
Pollutant	**4 Stroke, Rich-Burn**		
	AP-42 Table 3.2-3 Emission Factor (lb/MMBtu)	**Emissions lb/hr**	**Emissions tpy**
1,1,2,2-Tetrachloroethane	2.53E-05	4.26E-04	1.86E-03
1,1,2-Trichloroethane	1.53E-05	2.57E-04	1.13E-03
1,3-Butadiene	6.63E-04	1.12E-02	4.89E-02
1,3-Dichloropropene	1.27E-05	2.14E-04	9.36E-04
2,2,4-Trimethylbenzne	--	--	--
2-Methylnaphthalene	--	--	--
2,2,4-Trimethylpentane	--	--	--
Acenaphthylene	--	--	--
Acetaldehyde	2.79E-03	4.70E-02	2.06E-01
Acrolein	2.63E-03	4.43E-02	1.94E-01
Anthracene	--	--	--
Benz(a)anthracene	--	--	--
Benzene	1.58E-03	2.66E-02	1.16E-01
Benzo(e)pyrene	--	--	--
Benzo(k)fluoranthene	--	--	--
Biphenyl	--	--	--
Carbon Tetrachloride	1.77E-05	2.98E-04	1.30E-03
Chloroform	1.37E-05	2.31E-04	1.01E-03
Chrysene	--	--	--
Ethylbenzene	2.48E-05	4.17E-04	1.83E-03
Ethylene Dibromide	2.13E-05	3.58E-04	1.57E-03
Flouranthene	--	--	--
Flourene	--	--	--
Formaldehyde	0.02	3.37E-01	1.47E+00
Indeno(1,2,3-c,d)pyrene	--	--	--
Methanol	3.06E-03	5.15E-02	2.26E-01
Methylene Chloride	4.12E-05	6.93E-04	3.04E-03
Napthalene	9.71E-05	1.63E-03	7.16E-03
PAH	1.41E-04	2.37E-03	1.04E-02
Perylene	--	--	--
Phenanthrene	--	--	--
Phenol	--	--	--
Styrene	1.19E-05	2.00E-04	8.77E-04
Tetrachloroethane	--	--	--
Toluene	5.58E-04	9.39E-03	4.11E-02
Vinyl Chloride	7.18E-06	1.21E-04	5.29E-04
Xylene	1.95E-04	3.28E-03	1.44E-02
Total HAPs		**0.54**	**2.35**

Flares - Alternate Operating Scenario (FL-1 and FL-2)

Background Information	
Name	Flares (combined)
Gas Treatment Uptime Guarantee	98.5%
Conservative Flare Annual Operating %	3.0%
Flare Operating Hours/year:	262.8
Flow Rate (scf/min):	3135
Flow Rate (scf/hr):	188100
Fuel Rate (MMscf/yr):	49.43268

Pollutant	Emission Factor[a] (lb/MMscf)	lb/hr	tpy
VOC	84	15.80	2.08
NO_x	23.4	4.40	0.58
CO	27.6	5.19	0.68
PM	9	1.69	0.22
PM_{10}	9	1.69	0.22
$PM_{2.5}$	9	1.69	0.22
SO_2	97.77	18.39	2.42
H_2S	1.9554	0.37	0.05

a - Existing permit emission factors, AP-42 Table 2.4-4.

HAP Emission Calculations			
Pollutant	**Emission Factor (1) (lb/MMBtu)**	**Emission Factor (2) (lb/MMSCF)**	**Emissions (ton/yr)**
1,3-Butadiene	9.80E-06	5.88E-03	1.45E-04
1,4-Dichlorobenzene	2.00E-05	1.20E-02	2.97E-04
Acetaldehyde	5.30E-05	3.18E-02	7.86E-04
Carbon Tetrachloride	2.00E-05	1.20E-02	2.97E-04
Chlorobenzene	1.60E-05	9.60E-03	2.37E-04
Chloroform	1.70E-05	1.02E-02	2.52E-04
Ethylene Dichloride	1.50E-05	9.00E-03	2.22E-04
Formaldehyde	1.90E-04	1.14E-01	2.82E-03
Methylene Chloride	1.30E-05	7.80E-03	1.93E-04
Tetrachloroethylene	2.10E-05	1.26E-02	3.11E-04
Trichloroethylene	1.80E-05	1.08E-02	2.67E-04
Vinyl Chloride	3.60E-05	2.16E-02	5.34E-04
Vinylidene Chloride	1.50E-05	9.00E-03	2.22E-04
Arsenic	2.30E-06	1.38E-03	3.41E-05
Cadmium	5.80E-07	3.48E-04	8.60E-06
Chromium	1.20E-06	7.20E-04	1.78E-05
Lead	3.40E-06	2.04E-03	5.04E-05
Nickel	2.00E-06	1.20E-03	2.97E-05
Selenium	1.10E-05	6.60E-03	1.63E-04
Total HAPs			**6.9E-03**

(1) Emission Factors were derived from AP-42 Section 3.1, Table 3.1-7 and Table 3.1-8, where, Table 3.1-7.

Dryer (DRYER)

Background Information	
Name	Dryer
Heater/Boiler Rating* (MMBtu/hr):	7.63
Rating above is:	below 100 MMBtu/hr, uncontrolled
Operating Hours/year:	8760
Operating Load	80%
Natural Gas Heat Value (Btu/scf)[a]:	1020
Fuel Rate (scf/hr):	5984
Fuel Rate (scf/yr):	52,422,588

***** To supplement exhaust heat from ENG-1, ENG-2 and ENG-3

Parameter	Value
scf/lbmole	379.3
Btu/MMBtu	1,000,000
scf/MMscf	1,000,000
lb/ton	2,000
H_2S MW	34.08
SO_2 MW	64.06

Pollutant	Emission Factor[a,b,c,d] (lb/MMscf)	lb/hr	tpy
VOC	169	1.27	4.43
NO_x	100	0.75	2.62
CO	84	0.63	2.20
PM/PM_{10}	247.22	1.85	6.48
$PM_{2.5}$	247.22	1.85	6.48
SO_2	0.6	4.49E-03	0.02

a. Emission factors are taken from AP-42, Chapter 1, Tables 1.4-1 and 1.4-2, dated July 1998.
b. VOC emission factor is based on AP-42, Chapter 9.10.1.2, Table 9.10.1.2-2, emission factor for sugar beet drying operations. Using the conservative emission factor for a fuel oil-fired pulp dryer (in lb/ton of wet feed), and the dryer wet feed rate of 11.5 tons/hr.
c. PM_{10} and $PM_{2.5}$ emission factors are based on manufacturer data and include emissions from the natural gas heater, the dryer, and three engines.
d. SO_2 emissions are conservatively based on 100% conversion of H_2S to SO_2.

HAPS	Emission Factor[a] (lb/MMscf)	lb/hr	tpy
Arsenic	0.0002	1.50E-06	5.24E-06
Benzene	0.0021	1.57E-05	5.50E-05
Beryllium	0.000012	8.98E-08	3.15E-07
Cadmium	0.0011	8.23E-06	2.88E-05
Chromium	0.0014	1.05E-05	3.67E-05
Cobalt	0.000084	6.28E-07	2.20E-06
Dichlorobenzene	0.0012	8.98E-06	3.15E-05
Formaldehyde	0.075	5.61E-04	1.97E-03
n-Hexane	1.8	0.01	0.05
Lead	0.0005	3.74E-06	1.31E-05
Manganese	0.00038	2.84E-06	9.96E-06
Mercury	0.00026	1.94E-06	6.81E-06
Naphthalene	0.00061	4.56E-06	1.60E-05
Nickel	0.0021	1.57E-05	5.50E-05
POM	0.000088	6.58E-07	2.31E-06
Toluene	0.0034	2.54E-05	8.91E-05
Selenium	0.000024	1.80E-07	6.29E-07
Total HAPs		**0.01**	**0.05**

a. Emission factors are taken from AP-42, Chapter 1, Tables 1.4-3 and 1.4-4, dated July 1998.

Boiler (BOILER)

Background Information	
Name	Boiler
Heater/Boiler Rating (MMBtu/hr):	16
Rating above is:	below 100 MMBtu/hr, uncontrolled
Operating Hours/year:	8760
Operating Load	85%
Natural Gas Heat Value (Btu/scf)[a]:	1020
Fuel Rate (scf/hr):	13333
Fuel Rate (scf/yr):	116,800,000

a. Heating value for natural gas taken from Section 1.4 of AP-42 (dated 7/98).

Parameter	Value
scf/lbmole	379.3
Btu/MMBtu	1,000,000
scf/MMscf	1,000,000
lb/ton	2,000
H_2S MW	34.08
SO_2 MW	64.06

Pollutant	Emission Factor[a] (lb/MMscf)	lb/hr	tpy
VOC	3.6	0.06	0.21
NOx	70	1.10	4.09
CO	37.5	0.59	2.19
PM/PM_{10}	7.5	0.12	0.44
$PM_{2.5}$	7.5	0.12	0.44
SO_2	0.6[b]	0.01	0.04

a. Emission factors for criteria pollutants are based on manufacturer data. Other emission factors are taken from AP-42, Chapter 1, Tables 1.4-3 and 1.4-4, dated July 1998.
b. SO_2 emissions are conservatively based on 100% conversion of H_2S to SO_2.

HAPS	Emission Factor[a] (lb/MMscf)	lb/hr	tpy
Arsenic	0.0002	3.14E-06	1.17E-05
Benzene	0.0021	3.29E-05	1.23E-04
Beryllium	0.000012	1.88E-07	7.01E-07
Cadmium	0.0011	1.73E-05	6.42E-05
Chromium	0.0014	2.20E-05	8.18E-05
Cobalt	0.000084	1.32E-06	4.91E-06
Dichlorobenzene	0.0012	1.88E-05	7.01E-05
Formaldehyde	0.075	1.18E-03	4.38E-03
n-Hexane	1.8	0.03	0.11
Lead	0.0005	7.84E-06	2.92E-05
Manganese	0.00038	5.96E-06	2.22E-05
Mercury	0.00026	4.08E-06	1.52E-05
Naphthalene	0.00061	9.57E-06	3.56E-05
Nickel	0.0021	3.29E-05	1.23E-04
POM	0.000088	1.38E-06	5.14E-06
Toluene	0.0034	5.33E-05	1.99E-04
Selenium	0.000024	3.76E-07	1.40E-06
Total HAPs		**0.03**	**0.11**

a. Emission factors for criteria pollutants are based on manufacturer data. Other emission factors are taken from AP-42, Chapter 1, Tables 1.4-1 and 1.4-2, dated July 1998.

Gas Treatment Project (TAILGAS)

Gas Treatment - CO_2 Removal

Gas Stream Properties						
Component	**Digester Biogas**		**Product Gas**		**Tail Gas**	
Methane	60	vol%	99.0	vol%	0.1	vol%
CO_2	40	vol%	0.5	vol%	99.9	vol%
H_2S	600	ppmv	--	ppmv	30	ppmv
Flow Rate	3135	scfm	1,881	scfm	1,254	scfm

Emission Factor: 0.046788284 lb/scf of digester Biogas or 23.4 tons CO_2e/MMscf of digester Biogas

Parameter	Value
scf/lbmole	379.3
Btu/MMBtu	1,000,000
scf/MMscf	1,000,000
lb/ton	2,000
H_2S MW	34.08
CO_2 MW	44.01
CH_4 MW	16.04

Tail Gas vents to Atmosphere

Greenhouse Gasses (GHG)	**Gas Properties**		**Emissions**		
			lb/hr	**tons/MMscf**	**tpy**
H_2S	30.0	ppmv	0.2		0.9
Methane	0.1	vol%	3		14
Methane CO_2e			80		348
CO_2	99.9	vol%	8721		38199
CO_2e - Total			**8801**	**23.4**	**38,548**

Notes: CH4 and CO2 Mass to atm (lb/hr) = Flow Rate (scf/hr) * Vol % / Standard Molar Volume (scf/lbmol) * MW (lb/lbmol).
H_2S Mass to atm (lb/hr) = H_2S Max Concentration (ppmv) /10^6 * Flow Rate (scf/hr) / Standard Molar Volume (scf/lbmol) * H_2S MW (lb/lbmol).

Bedding Storage

Bedding Storage Building	**Throughput[1] (bone dry TPY)**	**PM**	**PM_{10}**	**$PM_{2.5}$[2]**	**3-sided Building Control Efficiency[3]**	**PM**	**PM_{10}**	**$PM_{2.5}$**
		(lb/ton bone dry bedding)				**(tons per year)**		
	30,218	0.1	0.1	0.05	80%	**0.30**	**0.30**	**0.15**

1 Target box State of Oregon DEQ emissions factors for wood products (AQ-EF02)(2011)
2 State of Oregon DEQ emissions factors for $PM_{2.5}$ fraction of PM10 (AQ-EF08)(2011)
3 Control of Open Fugitive Dust Sources (EPA-450/3-88-008, September, 1988, page 4-26)

Bedding Storage Emission Factors		
PM	**PM_{10}**	**$PM_{2.5}$**
(lbs/BDT)		
0.02	0.02	0.01

Unpaved Roads (UPR)

Background Information		
Throughput of bedding:	34,339	tpy
Number of trips bedding:	6,243	
Number of trips potato:	5,475	
Number of trips:	11,718.5	per year
Mean vehicle speed	15	mph

Unpaved Road		
	Empty	**Full**
Distance Travelled (ft):	300.0	300.0
Distance Travelled (mi):	0.06	0.06

	UNPAVED ROAD			
	EMPTY	FULL		
Pollutant	**Emission Factor (lb/VMT)**	**Emission Factor (lb/VMT)**	**Maximum Emissions (lb/yr)**	**Maximum Emissions (tpy)**
PM	5.001	5.861	7,232.3	3.62
PM_{10}	1.350	1.582	1,952.4	0.98
$PM_{2.5}$	0.1350	0.1582	195.2	0.10

Assumes 88 truck trips per day
Assumes 3.7 truck maximum per hour

UNPAVED ROADS

$$E = k\left(\frac{s}{12}\right)^{a} \cdot \left(\frac{W}{3}\right)^{b} \cdot \left(\frac{365 - P}{365}\right)$$

Where:

kPM	4.9	lb/VMT	Particle size multiplier AP-42 Section 13.2.2 (11/06)
kPM_{10}	1.5	lb/VMT	Particle size multiplier AP-42 Section 13.2.2 (11/06)
$kPM_{2.5}$	0.15	lb/VMT	Particle size multiplier AP-42 Section 13.2.2 (11/06)
s	6.4	%	Surface material silt content, municipal solid waste landfills, from AP-42 Sec 13.2.2 (11/06)
Wempty	13	ton	Average vehicle weight (tons); 13 tons empty
Wfull	18.5	ton	Average vehicle weight (tons); 18.5 tons full
P	66	day	Average # of wet days (>0.01") in time period;
a	0.7, 0.9		Constant (0.7 for PM, 0.9 for PM10 and PM2.5)
b	0.45		Constant